

EXHIBIT 1

LICENSE AGREEMENT

THIS LICENSE AGREEMENT (this "Agreement") is entered into by and between the CITY OF DULUTH, a municipal corporation created and existing under the laws of the State of Minnesota ("City"), and the STATE OF MINNESOTA, acting by and through the Commissioner of the Department of Natural Resources ("State").

The parties acknowledge the following:

A. City is the owner of certain real property in St. Louis County, Minnesota outlined in blue on the attached Exhibit A (collectively, the "Property").

B. State wishes to undertake, at no cost to City, a watershed stream restoration project to reduce erosion along Kingsbury Creek and 68th Avenue West Creek to reduce erosion and sedimentation washing downstream into Kingsbury Bay and enhance habitat for trout and associated cold-water organisms (the "Project"). The Project includes: (1) adjusting the stream channel size and shape; (2) establishing a hydraulic connection between the channel and the floodplain; (3) stabilizing streambanks; and (4) enhancing vegetation in the riparian corridor, all as described on the attached Exhibit B (the "Project Summary").

C. State desires a license to access certain portions of the Property to: (i) stage equipment and materials for the Project; (ii) provide ingress and egress in order to perform the Project; and (iii) perform the Project.

D. State and City desire to enter into this Agreement to allow State to access the Property for the purposes permitted by this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained in this Agreement, the receipt and sufficiency of which is acknowledged, the parties agree as follows:

1. THE LICENSE.

A. Subject to the terms and conditions set forth herein, City grants to State a non-exclusive license to enter and occupy those portions of the Property described in Section 4 below, for the purposes set forth in Section 4 below. The requirements and conditions set forth in (i) the exhibits to this Agreement, including but not limited to the Project Summary; and (ii) any permits issued in relation to the Project are incorporated into this Agreement.

B. State acknowledges and understands that its use of the Property is subject to certain rights in favor of the public, and the cooperation of all users and coordination of activities on the Property is required. This cooperation includes ingress and egress and use of amenities and related improvements. City's Property and Facilities Manager (the

“Manager”) shall ultimately determine the appropriate use of the Property and shall decide any disputes between State and any other users of the Property.

C. State’s use of the Property shall in no way limit or restrict City’s or the public’s use of the Property. City shall continue to enjoy unlimited access to the Property during the Term (defined below).

2. TERM OF THE AGREEMENT. Notwithstanding the date of execution of this Agreement, the term of this Agreement shall commence on August 1, 2021, and shall continue through December 31, 2023, unless earlier terminated as permitted by this Agreement (the “Term”).

3. LICENSE FEE. State shall have the use of the Property at no cost. The parties agree that the benefit to the Property and the public benefit of the Project shall be considered adequate consideration. The Project shall be completed by State at no cost to City.

4. LIMITED USE. The Property may only be used for the Project and for no other purpose. The work to be performed on the Property is summarized as follows and shall be consistent with the plans and specifications attached as Exhibit C, as they may be amended from time to time with the prior written consent of the Manager (the “Final Plans”):

- (a) The DNR may construct one or more temporary access roads within the Property for ingress and egress to 68th Ave W Creek. Such roads shall be constructed in a manner which minimizes long term damage to the Property. The DNR shall maintain all temporary roads (grading and snow removal) within the Property at DNR’s expense. Such roads shall be restored to their previous condition prior to the end of this Agreement by the DNR at its expense OR deemed to be part of the Property at the end of this Agreement.
- (b) The DNR may implement activities as part of the Project such as: vegetation or debris clearing, channel and bank grading, bank stabilization, channel realignment, and temporary stream dewatering.
- (c) The DNR may install permanent features as part of the Project, such as rock vanes, rock check dams, j-hooks, vegetated reinforced slopes, erosion control matting, riprap drainage, culvert repair and/or removal, and seeded or planted native vegetation.
- (d) The DNR may remove trees and shrubs on the Property to access 68th Ave W Creek or to allow for channel realignment. Removed trees and woody debris may be used in the toe wood/root wad structures along portions of the stream.
- (e) The DNR may use the portion of the Property and adjacent platted right-of-way outlined in yellow on Page 1 of Exhibit A (the “Staging Area”) for staging equipment and materials for the Project.

Any erosion control blanket, straw or the like for the purpose of erosion control and soil stabilization used must be “weed free certified”. Any activities not approved by the Manager may be grounds for termination of this Agreement.

5. UTILITIES. State agrees to follow all notice requirements under Minn. Stat. § 216D.04, Subd. 1(a) regarding determination of underground utilities and notification of property owners. Failure to abide by the notice requirements under Minn. Stat. § 216D.04, Subd. 1(a) shall be grounds for immediate termination of this Agreement.

6. ADDITIONAL AUTHORIZATION. State acknowledges that this Agreement only provides a license to use the Property, and does not permit State to cross or use any adjacent land owned by City or any third party. State must obtain written permission from owners of other property as necessary to obtain access necessary for the Project.

7. TERMINATION.

A. This Agreement may be terminated by either party with or without cause by providing fifteen (15) business days’ written notice to the other party as hereinafter provided.

B. City may terminate this Agreement immediately on notice to State if City believes in good faith that the health, welfare, or safety of occupants or neighbors of the Property would be placed in immediate jeopardy by the continuation of this Agreement.

8. CITY WARRANTY. City makes no representation that the Property is suitable for any particular purpose or specific uses and State accepts the Property in “as is” condition without representations or warranties of any kind. City makes no representations or warranties that it actually owns or has an interest in the Property.

9. MAINTENANCE AND RESTORATION.

A. Prior to expiration of the Term, State shall restore the Property and Staging Area to the equivalent of their original condition at the time of execution of this Agreement or and in the following ways: uncompact soil and smooth out ruts, seed with native wet meadow species appropriate for the location, any significant tree removal must follow the Uniform Development Code and appropriate tree replacement requirements, planted seedlings that currently exist shall be identified and replaced with same species with proper browse protection. Any erosion control blanket, straw or the like for the purpose of erosion control and soil stabilization used must be “weed free certified”. Restoration of the Property shall be at the State’s sole cost and expense. State shall be responsible to restore any City-owned property adjacent to the Property if damage is sustained to any City-owned property during the course of the Project.

B. State shall not make any alterations or improvements to the Property that are not herein described without the prior written consent of City and then only upon the terms and conditions which may be imposed by City.

10. LIABILITY. Each party is responsible for its own acts and omissions and the results thereof to the extent authorized by law and shall not be responsible for the acts and omissions of the other party and the results thereof. State's liability is governed by the provisions of the Minnesota Tort Claims Act, Minnesota Statutes, Section 3.736 and other applicable law. City's liability is governed by Minnesota Statutes, Chapter 466 and other applicable law.

11. INSURANCE. During the Term, State shall have such insurance coverage as will protect State and City against risk of loss or damage to the Property and any other property of City located or used at the Property and against claims that may arise or result from the use of the Property during the Term. State shall procure and maintain continuously in force automobile and Public Liability Insurance written on an "occurrence" basis under a Comprehensive General Liability Form in limits of not less than \$1,500,000 aggregate per occurrence for personal bodily injury and death and limits of \$1,500,000 for property damage liability. Insurance required in this Agreement shall be taken out and maintained in responsible insurance companies organized under the laws of the state of Minnesota and licensed to do business in Minnesota. Insurance shall cover public liability including premises and operations coverage, independent contractors - protective contingent liability, personal injury, contractual liability covering the obligations set forth herein, and products – completed operations. State shall provide City with Certificate(s) of Insurance evidencing the required insurance coverage, with 30-day notice of cancellation, non-renewal, or material change provisions included. City does not represent or guarantee that the types or limits of coverage required by this Agreement are adequate to protect State's interests and liabilities. The required insurance policies and certificates shall be in form acceptable to the City Attorney and shall name City as an additional insured. City reserves the right to require State to increase the coverages set forth above and to provide evidence of such increased insurance to reflect the municipal liability limits set forth in Minn. Stat. § 466.04, as amended from time to time. If deemed sufficient by the City Attorney, State may meet the requirements of this paragraph 11 in whole or in part through self-insurance.

12. INDEPENDENT CONTRACTOR. Nothing contained in this Agreement is intended or should be construed in any manner as creating or establishing the relationship of co-partners between the parties or as constituting State or State personnel as an agent, representative, or employee of City for any purpose or in any manner whatsoever. State and its employees shall not be considered employees of City and any and all claims that may or might arise under the Workers' Compensation Act of the State of Minnesota on behalf of State's employees or agents while so engaged, shall in no way be the responsibility of City.

13. ASSIGNMENT. State shall not in any way assign or transfer its rights or interests under this Agreement. However, State may hire contractors to work on the Project. State shall remain primarily responsible for all work performed by its contractor(s) or subcontractor(s). Any contractor hired by State shall procure the

following insurance coverages and provide proof of coverage to City prior to conducting any work on the Property:

- (a) Commercial Liability and Automobile Insurance, naming City as additional insured, in the amount of at least \$1,500,000 aggregate per occurrence for personal bodily injury and death and limits of \$1,500,000 for property damage liability, from an insurance carrier organized under the laws of the states of the United States and licensed to do business in Minnesota. Insurance shall cover public liability including premises and operations coverage, independent contractors - protective contingent liability, personal injury, contractual liability covering the indemnity obligations set forth herein, and products – completed operations. The policy shall provide that City be notified thirty (30) days prior to the cancellation or termination, non-renewal, or material change of the policy.
- (b) Required insurance policies must be in form and substance that is acceptable to the City Attorney.
- (c) City reserves the right to require an increase to the coverages set forth above and to provide evidence of such increased insurance to reflect the municipal liability limits set forth in Minn. Stat. § 466.04, as amended from time to time.

14. LAWS, RULES AND REGULATIONS.

A. State shall conduct its activities related to the Property in strict compliance with the United States Constitution and with the applicable laws, rules, and regulations of the United States, State of Minnesota, St. Louis County, and City of Duluth, including, but not limited to, all laws, rules, and regulations relating to accessibility standards under the Americans with Disabilities Act. State shall not unlawfully discriminate and shall comply with all applicable federal and state laws regarding non-discrimination.

B. State shall procure, at State's expense, all licenses, permits and other authorizations necessary for carrying out its obligations under this Agreement and completing the Project, including but not limited to DNR public waters, fill, erosion control, and shoreland permits.

15. RECORDS RETENTION. State shall maintain all books, records, documents, and other evidence pertaining to this Agreement for six (6) years after termination or expiration of this Agreement for any reason.

16. GOVERNMENT DATA PRACTICES. City and State shall comply with the Minnesota Data Practices Act, Minn. Stat. Chapter 13, as it applies to all data relating to this Agreement.

17. WAIVER. The waiver by City or State of any breach of any term, covenant, or condition of this Agreement shall not be deemed to be a waiver of any subsequent breach of same or any other term, covenant, or condition in this Agreement.

18. SEVERABILITY. If any term or provision of this Agreement is declared by a court of competent-jurisdiction to be illegal or in conflict with any law, then the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if this Agreement did not contain the particular term or provision held to be invalid.

19. NO THIRD PARTY RIGHTS. This Agreement is to be construed and understood solely as an agreement between State and City regarding the subject matter herein and shall not be deemed to create any rights in any other person or on any other matter. No person shall have the right to make a claim that they are a third party beneficiary of this Agreement or of any of the terms and conditions hereof, which may be waived at any time by mutual agreement between the parties.

20. NOTICES. Notices provided pursuant to this Agreement shall be sufficient if sent by regular United States mail, postage prepaid, addressed to:

State of Minnesota
Attn: Lands and Minerals Division
Department of Natural Resources
500 Lafayette Road, Box 45
St. Paul, Minnesota 55155-4045
(651) 259-5959

City of Duluth
Attn: Property and Facilities Manager
1532 W. Michigan Street
Duluth, Minnesota 55806
(218) 730-4430

Copy to: State of Minnesota
Department of Natural Resources
525 Lake Avenue South #415
Duluth, Minnesota 55802

or to such other persons or addresses as the parties may designate to each other in writing from time to time.

21. COMPLIANCE WITH AGREEMENT. The rights of State to use the Property are subject to State's compliance with the undertakings, provisions, covenants, and conditions set forth in this Agreement.

22. APPLICABLE LAW. This Agreement, together with all of its paragraphs, terms, and provisions, is made in the State of Minnesota and shall be construed and interpreted in accordance with the laws of the State of Minnesota.

23. AMENDMENTS. Any amendments to this Agreement shall be in writing and shall be executed in the same manner as this Agreement.

24. AUTHORITY TO EXECUTE AGREEMENT. The parties represent to each other that the execution of this Agreement has been duly and fully authorized by their respective governing bodies or boards, that the individuals who executed this Agreement

on their behalf are fully authorized to do so, and that this Agreement when thus executed by said individuals will constitute and be the binding obligation and agreement of the parties in accordance with the terms and conditions of this Agreement.

25. ENTIRE AGREEMENT. This Agreement, including exhibits, constitutes the entire agreement between the parties and supersedes all prior written and oral agreements and negotiations between the parties relating to the subject matter hereof. This Agreement may be executed and delivered by a party by facsimile or PDF transmission, which transmission copy shall be considered an original and shall be binding and enforceable against such party.

[Remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the parties have set their hands the day and date as indicated below.

CITY OF DULUTH, MINNESOTA

STATE OF MINNESOTA, acting by and through the Commissioner of the Department of Natural Resources

By: _____
Mayor

By: _____

ATTEST:

Title: _____

City Clerk

Dated: _____

Dated: _____

COUNTERSIGNED:

STATE ENCUMBRANCE VERIFICATION
Individual certifies that funds have been encumbered as required by Minn. Stat. 16A.15 and 16C.05

City Auditor

Signed _____

APPROVED AS TO FORM:

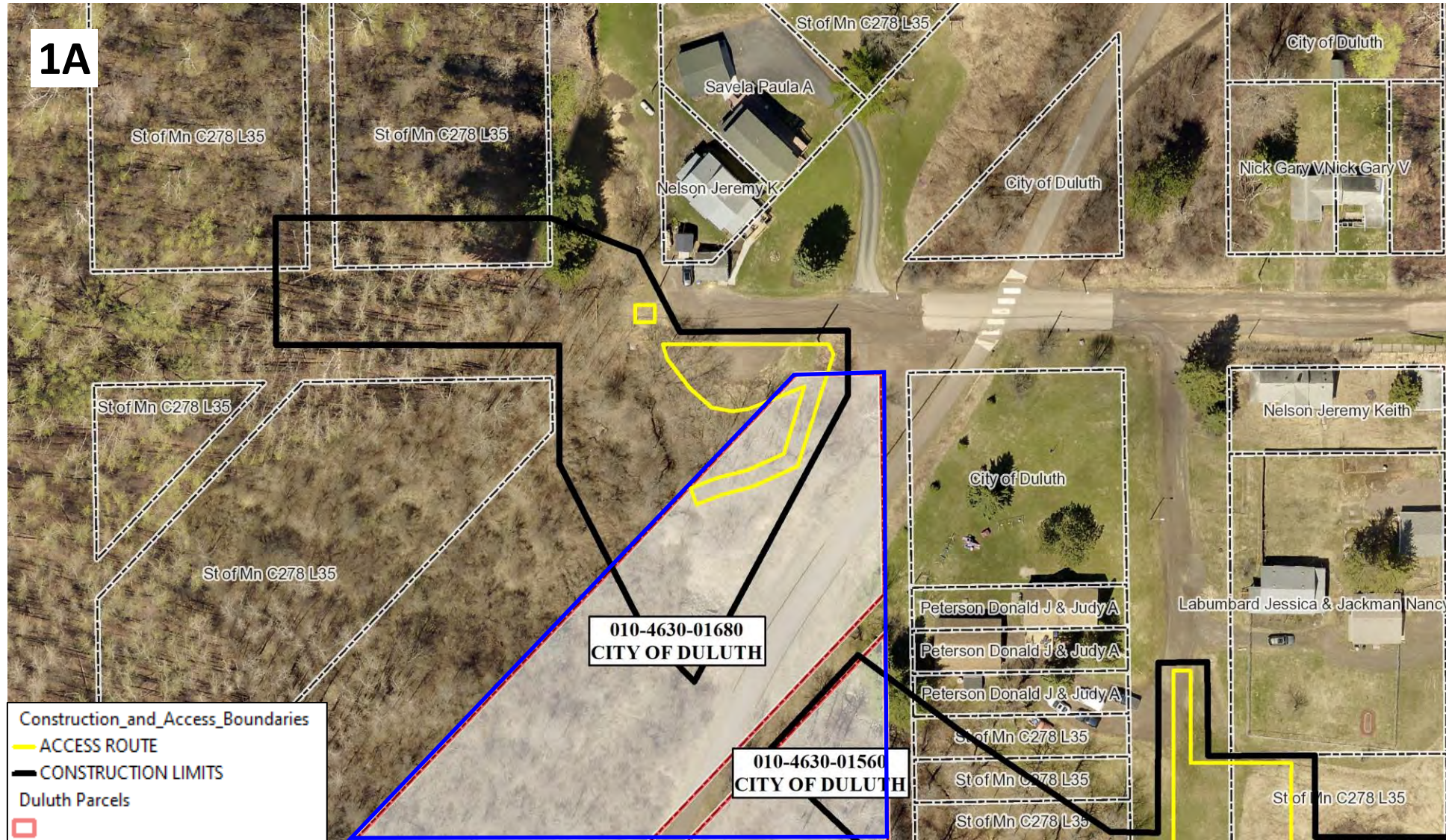
Date: _____


City Attorney

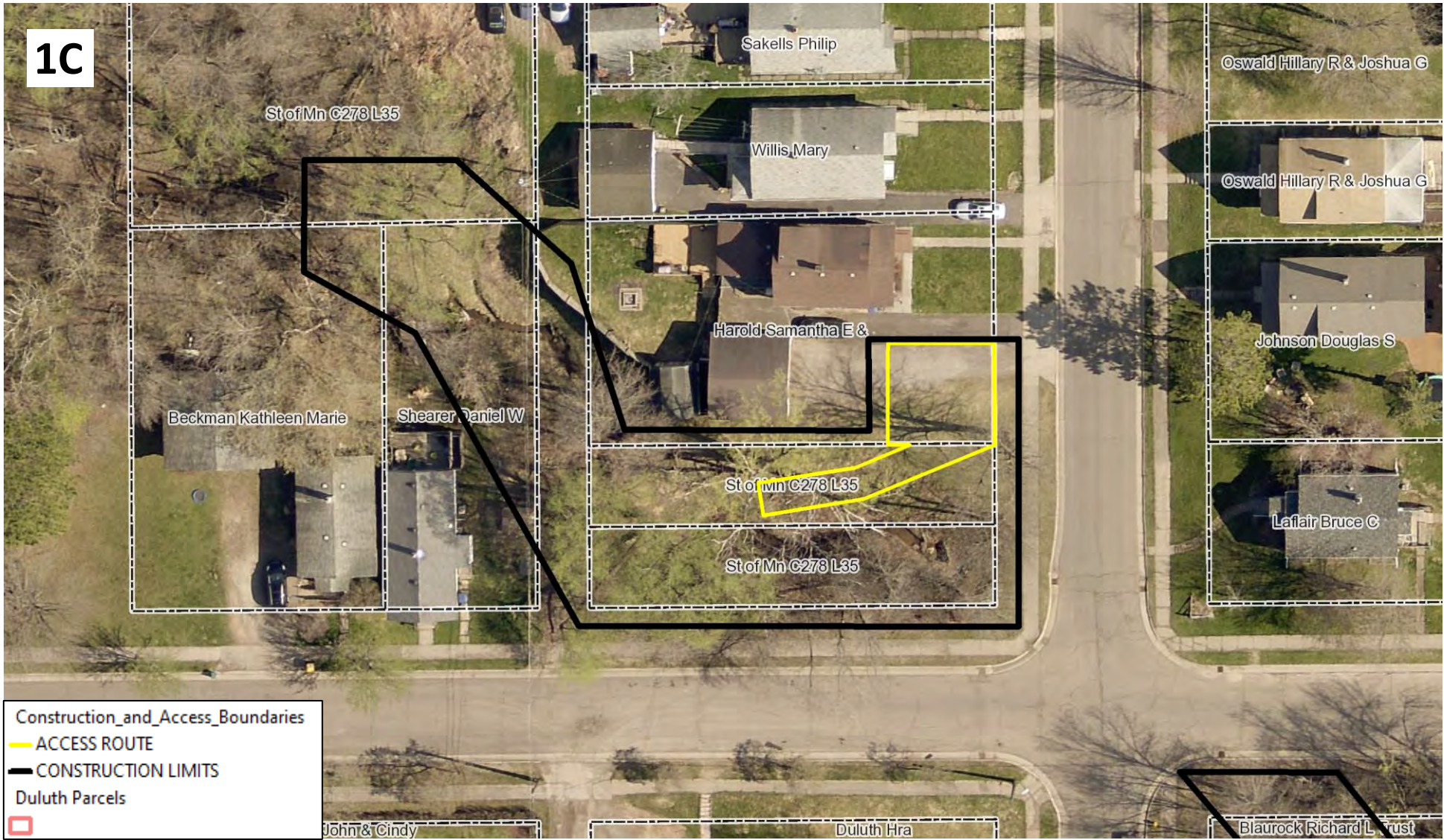
Contract: _____

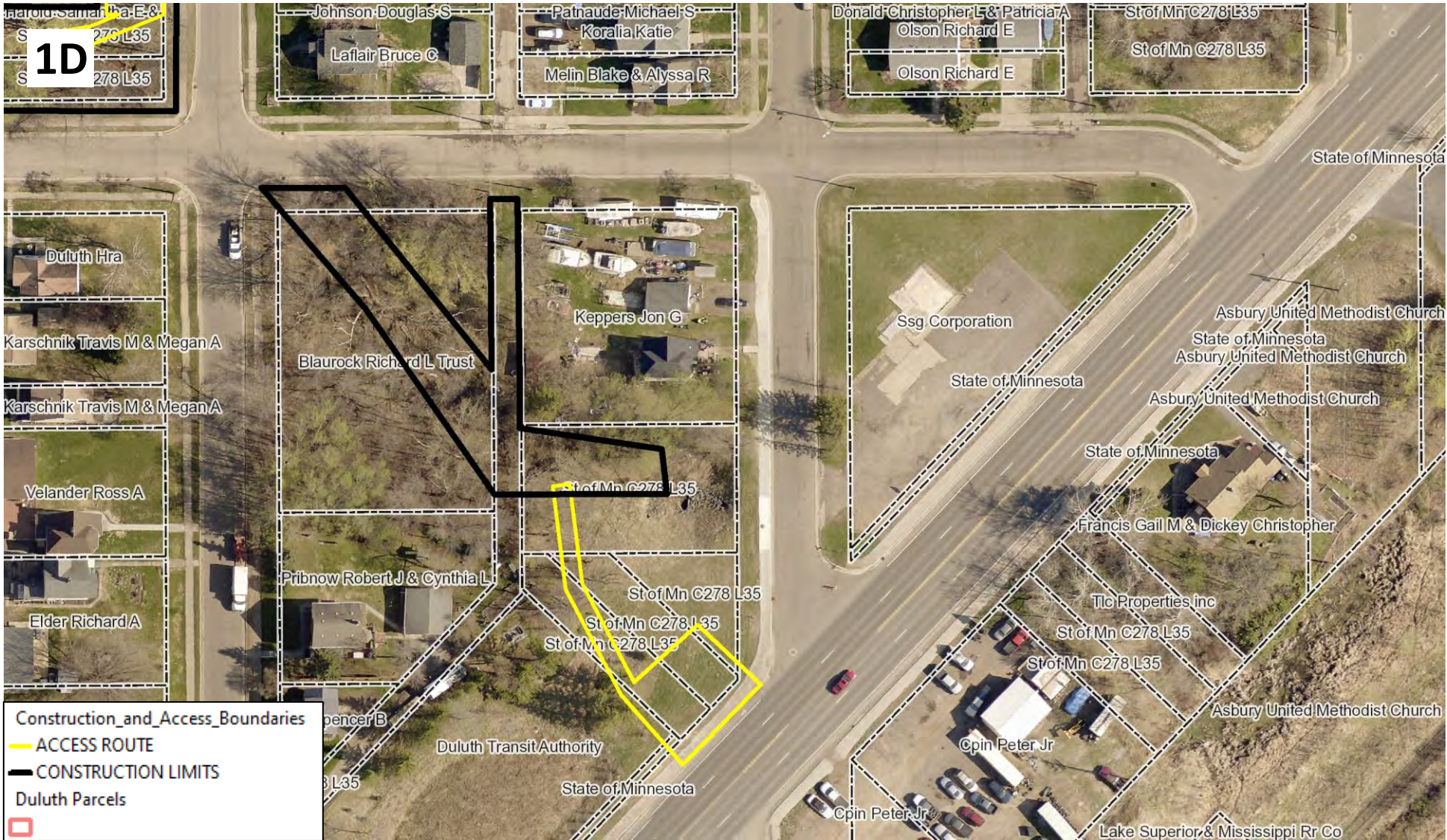
EXHIBIT A

1A



 Property





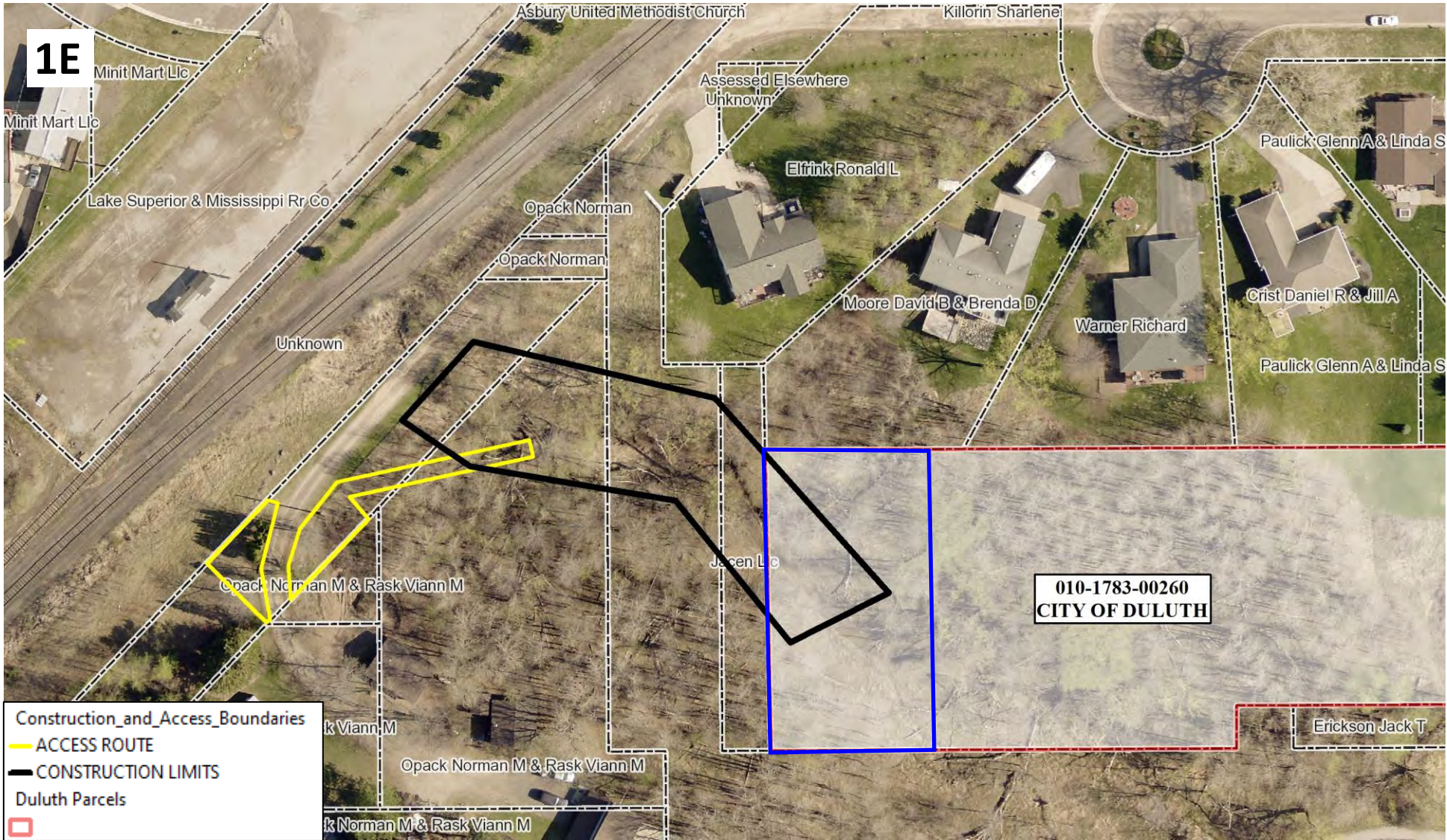


EXHIBIT B

The Minnesota Department of Natural Resources plans to reduce erosion and sedimentation, and restore and enhance habitat for trout and associated cold-water organisms, in the Kingsbury Creek watershed and 68th Avenue West Creek. Both creeks enter the St. Louis River at Kingsbury Bay.

MNDNR is currently working to restore Kingsbury Bay, an 80-acre shallow bay in the St. Louis River estuary that has received excessive sediment inputs from Kingsbury Creek. Decades of sediment accumulation filled the bay's open water wetlands, converting them to shallow stands of non-native cattail. MNDNR began restoring Kingsbury Bay in 2019 by dredging sediments to create open water and wetlands supporting native plants. Restoration of Kingsbury Bay is an element of the Natural Resource Damage Assessment (NRDA) settlement for the St. Louis River Interlake/Duluth Tar Superfund Site. The project is scheduled for completion in fall 2021. In order to increase the resiliency of this restoration work, the Trustees for the NRDA process consider it important to also address the underlying causes of excessive sedimentation in the Kingsbury Creek watershed.

Working on behalf of the Trustees, MNDNR began a process to assess the Kingsbury Creek watershed and select one or more projects to reduce future sediment loading in the creek, while also considering the ecological functions and biological habitat of the stream system. In 2019, Barr Engineering Co. completed a feasibility study of the Kingsbury Creek watershed. They identified stream reaches and watershed areas that are contributing excessive sediment, and recommended conceptual plans for restoration or stabilization of these areas. In 2020, the NRDA Trustees worked with MNDNR and a team of local resource managers to review the feasibility study and selected multiple projects to implement.

Construction of the selected projects is anticipated to begin in 2021 or 2022 and will be funded through the NRDA settlement and the MN Outdoor Heritage Fund. Specific components of the Kingsbury Creek Watershed stream restoration project include: (1) adjusting the stream channel size and shape; (2) establishing a hydraulic connection between the channel and floodplain; (3) stabilizing streambanks; and (4) enhancing vegetation in the riparian corridor.

KINGSBURY CREEK RESTORATION

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

DULUTH, MINNESOTA

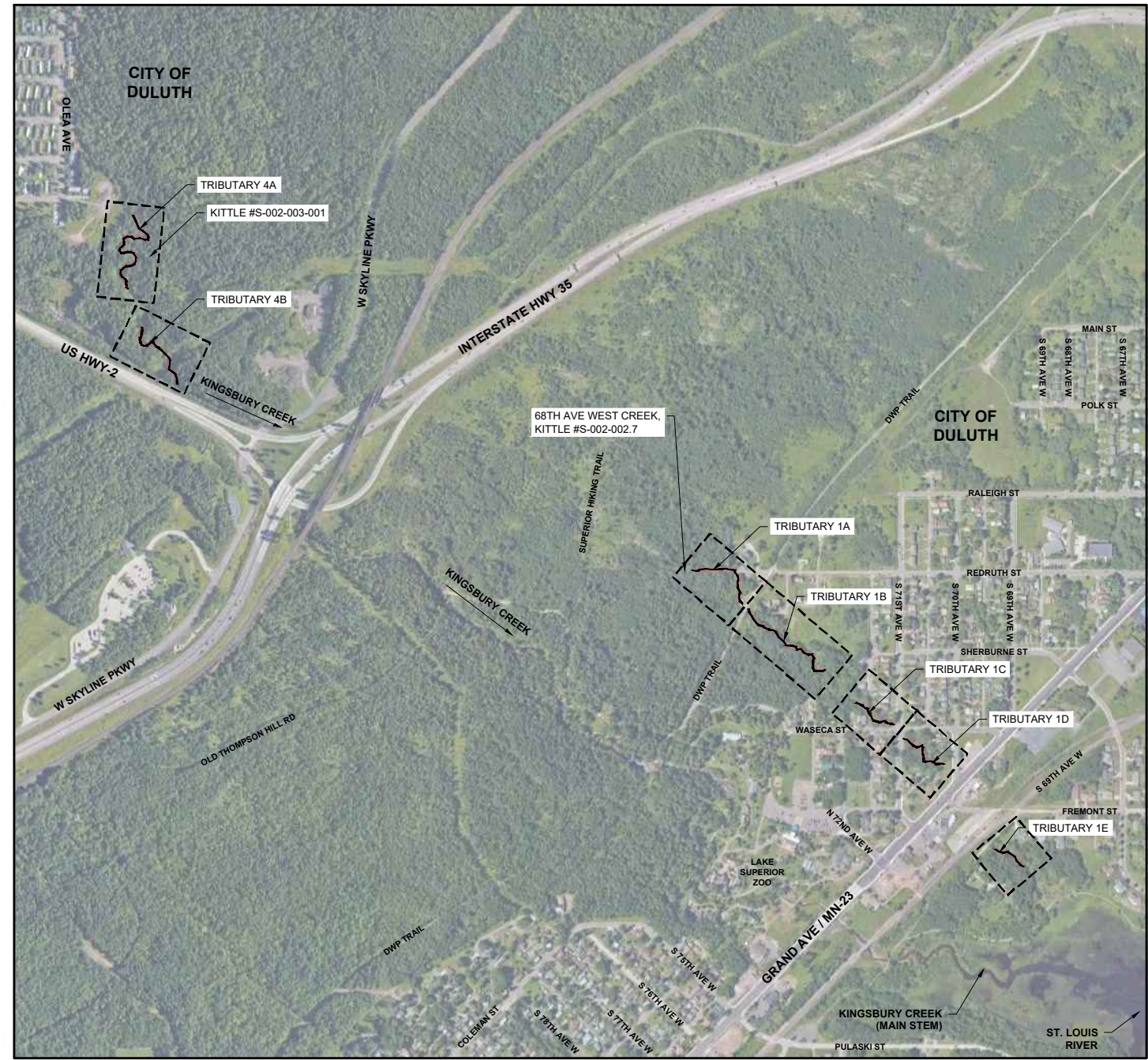
SHEET INDEX

[BOLD TEXT INDICATES SHEET INCLUDED IN SUBMITTAL]

- G-01 TITLE, INDEX, AND VICINITY MAP
- C-01 SWPPP, 1 OF 2
- C-02 SWPPP, 2 OF 2
- C-03 EROSION CONTROL PLAN OVERALL
- C-04 EROSION CONTROL DETAILS
- C-05 TRIBUTARY 1A SITE ACCESS, EROSION CONTROL AND REMOVALS
- C-06 TRIBUTARY 1A PLAN
- C-07 TRIBUTARY 1A PROFILE
- C-08 TRIBUTARY 1A SECTION AND STRUCTURE TABLE
- C-09 TRIBUTARY 1A REVEGETATION PLAN
- C-10 TRIBUTARY 1B SITE ACCESS, EROSION CONTROL AND REMOVALS
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- D-02 STREAM RESTORATION DETAILS
- D-03 STREAM RESTORATION DETAILS
- D-04 SITE CONSTRUCTION DETAILS
- D-05 SITE CONSTRUCTION DETAILS
- D-06 SITE CONSTRUCTION DETAILS
- R-01 SITE RESTORATION DETAILS
- R-02 SEED MIXES AND PLANTING SCHEDULE



MINNESOTA COUNTY MAP



SYMBOL LEGEND

SECTION VIEW CALL OUT

LIMITS OF SECTION CUT

SECTION IDENTIFIER

SECTION REFERENCES (SHEET SECTION IS LOCATED ON)

SECTION VIEW TITLE

SECTION IDENTIFIER (TYP.)

SECTION: GRAPHICS STANDARDS

SCALE: 1=1

SECTION REFERENCES (TYP.)

SHEET SECTION IS CALLED-OUT ON

DETAIL VIEW CALL OUT

DETAIL IDENTIFIER

DETAIL REFERENCES (SHEET DETAIL IS LOCATED ON)

DETAIL VIEW TITLE

DETAIL IDENTIFIER (TYP.)

DETAIL: GRAPHICS STANDARDS

SCALE: 1=1

DETAIL REFERENCES (TYP.)

SHEET DETAIL IS CALLED-OUT ON

PROJECT CONTACTS

ENGINEER CONTACT:
 JESSICA OLSON, PE
 BARR ENGINEERING CO.
 325 S LAKE AVE, STE 700
 DULUTH, MN 55802
 218-529-7118
 JOLSON@BARR.COM

OWNER'S REPRESENTATIVE CONTACT:
 JON HENDRICKSON, PRINCIPAL ENGINEER
 MINNESOTA DEPARTMENT OF NATURAL RESOURCES (MnDNR)
 1568 COUNTY HWY 2
 TWO HARBORS, MN 55616
 218-834-1410
 JON.HENDRICKSON@STATE.MN.US

ISSUED FOR BID
NOT FOR CONSTRUCTION

Approval

Operations Services Division _____ Date _____

GOPHER STATE ONE CALL
 CALL BEFORE YOU DIG.
 1-800-252-1166

Department of Ecological & Water Resources _____ Date _____



Project Office:
BARR ENGINEERING CO.
 325 SOUTH LAKE AVENUE
 SUITE 700
 DULUTH, MN 55802
 Ph: (218) 529-8200
 Fax: (218) 529-8202
 www.barr.com

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly licensed professional engineer under the laws of the state of Minnesota.

Name: JESSICA C. L. OLSON License #: 43102

Date: _____

Operations Services
 Safety
 Facilities
 Materials
 Equipment
 Field Operations
 Information Management

KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **TITLE, INDEX AND VICINITY MAP**

Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **G-01**

CC2: _____
 File #: _____

1.0 GENERAL CONSTRUCTION ACTIVITY INFORMATION:

THIS STORMWATER POLLUTION PREVENTION PLAN (SWPPP) HAS BEEN PREPARED IN COMPLIANCE WITH THE MINNESOTA GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY NO. MNR100001 (GENERAL PERMIT), AS REQUIRED BY THE MINNESOTA POLLUTION CONTROL AGENCY (MPCA) UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM (NPDES/SDS) PROGRAM.

THE PROJECT IS LOCATED IN THE CITY OF DULUTH, ST. LOUIS COUNTY, MINNESOTA. PROPOSED CONSTRUCTION ACTIVITIES WILL TAKE PLACE ALONG FOUR STREAM SEGMENTS IN SECTIONS 10, 11, 13 AND 14, TOWNSHIP 49N, RANGE 15W. THE APPROXIMATE CENTROID OF THE PROJECT HAS A LATITUDE OF 46.732214 AND A LONGITUDE OF -92.199416.

THIS PROJECT INVOLVES RESTORATION AND STABILIZATION OF TRIBUTARIES TO KINGSBURY CREEK. RESTORATION AND STABILIZATION TECHNIQUES INCLUDE BUT ARE NOT LIMITED TO: RAISING THE CHANNEL BED THROUGH PLACEMENT OF GRADE CONTROL STRUCTURES, VEGETATED REINFORCED SOIL SLOPES, LIVE STAKES, GRADING WITH EROSION CONTROL BLANKETS AND PLACING RIPRAP TO PREVENT BANK MIGRATION. THE PROJECT AS PROPOSED HAS A TOTAL DISTURBANCE AREA OF 1.89 ACRES. EROSION PREVENTION AND SEDIMENT CONTROL MEASURES ARE REQUIRED TO MINIMIZE SEDIMENT FROM BEING TRANSPORTED INTO THE KINGSBURY CREEK AND LAKE SUPERIOR, WHICH ARE IMPAIRED WATERBODIES. REFER TO PROJECT DRAWINGS FOR FURTHER DETAILS. (CSW PERMIT PART III.A.1)

1.1 PROJECT SIZE AND CUMULATIVE IMPERVIOUS SURFACE:

- THE ANTICIPATED AREA OF DISTURBANCE IS APPROXIMATELY 1.89 ACRES.
- THE TOTAL AREA OF PRE-CONSTRUCTION IMPERVIOUS AREA IS APPROXIMATELY 0 ACRES.
- THE TOTAL AREA OF POST-CONSTRUCTION IMPERVIOUS AREA IS APPROXIMATELY 0 ACRES.
- THE TOTAL NEW IMPERVIOUS AREA IS APPROXIMATELY 0 ACRES.

1.2 DATES OF CONSTRUCTION:

- ANTICIPATED START DATE: SEPTEMBER 1, 2021
- ANTICIPATED END DATE: JULY 31, 2022

1.3 CONTACT INFORMATION:

OWNER: MN DNR
 MAILING ADDRESS: 1568 County Hwy. 2 Two Harbors, MN
 CONTACT PERSON: Jon Hendrickson
 PHONE NUMBER: 218-834-1410
 ALTERNATE CONTACT PERSON: Ben Nicklay
 PHONE NUMBER: 218-328-8825

TITLE: Principal Engineer
 EMAIL ADDRESS: Jon.Hendrickson@state.mn.us
 TITLE: Project Coordinator
 EMAIL ADDRESS: Ben.Nicklay@state.mn.us

OPERATOR / GENERAL CONTRACTOR (WILL OVERSEE IMPLEMENTATION OF THE SWPPP):

MAILING ADDRESS: _____
 CONTACT PERSON: _____
 PHONE NUMBER: _____

TITLE: _____
 EMAIL ADDRESS: _____

PARTY RESPONSIBLE FOR LONG-TERM OPERATION AND MAINTENANCE OF THE PERMANENT STORMWATER MANAGEMENT SYSTEM: N/A

2.0 RECEIVING WATERS:

WATERS WITHIN ONE MILE (NEAREST STRAIGHT LINE DISTANCE) THAT ARE LIKELY TO RECEIVE STORMWATER RUNOFF FROM THE PROJECT SITE (CSW PERMIT ITEM 5.10) INCLUDE:

NAME OF WATER BODY	TYPE ⁽¹⁾	WATER BODY ID ⁽²⁾	SPECIAL WATER? ⁽³⁾	IMPAIRED WATER? ⁽³⁾	PUBLIC WATER WITH WORK IN WATER RESTRICTIONS?
UNNAMED CREEK (KINGSBURY CREEK)	STREAM	04010201-787	YES	NO	NO
UNNAMED CREEK (KINGSBURY CREEK)	STREAM	04010201-981	YES	NO	NO
UNNAMED CREEK (KINGSBURY CREEK)	STREAM	04010201-788	YES	NO	NO
KINGSBURY CREEK	STREAM	04010201-626	YES	YES	YES
ST. LOUIS RIVER (ST. LOUIS BAY)	RIVER/BAY	04010201-533	YES	NO	YES

- (1) TYPE EXAMPLES: DITCH, POND, WETLAND, CALCAREOUS FEN, LAKE, STREAM, RIVER
 (2) WATER BODY IDENTIFICATION (ID) MIGHT NOT BE AVAILABLE FOR ALL WATER BODIES. USE THE SPECIAL AND IMPAIRED WATERS SEARCH TOOL AT: [HTTPS://WWW.PCA.STATE.MN.US/WATER/STORMWATER-SPECIAL-AND-IMPAIRED-WATERS-SEARCH](https://www.pca.state.mn.us/water/stormwater-special-and-impaired-waters-search)
 (3) REFER TO CSW PERMIT SECTION 23. IMPAIRED WATER FOR THE FOLLOWING POLLUTANT(S) OR STRESSOR(S): PHOSPHORUS (NUTRIENT EUTROPHICATION BIOLOGICAL INDICATORS), TURBIDITY, TOTAL SUSPENDED SOLIDS (TSS), DISSOLVED OXYGEN, OR AQUATIC BIOTA (FISH BIOASSESSMENT, AQUATIC PLANT BIOASSESSMENT, AND AQUATIC MACROINVERTEBRATE BIOASSESSMENT)

2.1 SPECIAL AND IMPAIRED WATERS: THE MPCA'S SPECIAL AND IMPAIRED WATERS SEARCH TOOL WAS USED TO LOCATE SPECIAL AND IMPAIRED WATERS WITHIN ONE MILE (AERIAL RADIUS MEASUREMENT) OF THE PROJECT SITE. KINGSBURY CREEK HAS HAVE AN EPA-APPROVED IMPAIRMENT FOR FISH BIOASSESSMENT AND BENTHIC MACROINVERTEBRATES. FISH BIOASSESSMENT IS CONSIDERED CONSTRUCTION RELATED AND REQUIRES ADDITIONAL BEST MANAGEMENT PRACTICES (BMPs) OR PLAN REVIEW FOR COMPLIANCE WITH THE GENERAL PERMIT. (CSW PERMIT ITEM 2.7 AND SECTION 23)

THIS PROJECT DOES NOT INCLUDE ANY ADDITIONAL BMPs OR OTHER SPECIFIC CONSTRUCTION RELATED IMPLEMENTATION ACTIVITIES IDENTIFIED IN AN APPROVED TOTAL MAXIMUM DAILY LOAD (TMDL). (CSW PERMIT ITEM 5.19)

2.2 PUBLIC WATERS WITH WORK IN WATER RESTRICTIONS: KINGSBURY CREEK, UNNAMED TRIBUTARIES TO KINGSBURY CREEK AND THE ST. LOUIS RIVER ARE IDENTIFIED BY THE DNR AS A PUBLIC WATER. WORK IS RESTRICTED FOR LAKES IN NORTHWEST MINNESOTA BETWEEN APRIL 1-JUNE 30. DURING THE RESPECTIVE RESTRICTION PERIODS, ALL EXPOSED SOILS WITHIN 200 FEET OF THE WATER'S EDGE WILL HAVE EROSION PREVENTION STABILIZATION ACTIVITIES INITIATED IMMEDIATELY AFTER CONSTRUCTION ACTIVITY HAS CEASED (AND COMPLETED WITHIN 24 HOURS). (CSW PERMIT ITEM 5.11)

2.3 WETLAND IMPACTS: THIS PROJECT DOES NOT INCLUDE WETLAND IMPACTS. (CSW PERMIT ITEMS 2.4 AND 2.10, AND SECTION 22)

2.4 ENVIRONMENTAL REVIEW AND OTHER REQUIRED REVIEWS: STORMWATER MITIGATION MEASURES ARE NOT REQUIRED AS A RESULT OF AN ENVIRONMENTAL REVIEW (E.G., EAW OR EIS), ENDANGERED OR THREATENED SPECIES REVIEW, ARCHEOLOGICAL SITE REVIEW, OR OTHER LOCAL, STATE, OR FEDERAL REVIEW CONDUCTED FOR THE PROJECT. (CSW PERMIT ITEMS 2.8, 2.9, AND 5.16)

2.5 KARST AREAS OR DRINKING WATER SUPPLY MANAGEMENT AREAS: THIS PROJECT DOES NOT INCLUDE ANY KARST OR DRINKING WATER SUPPLY MANAGEMENT AREAS. (CSW PERMIT ITEMS 16.19, 16.20, AND 18.10)

3.0 PROJECT PLANS AND SPECIFICATIONS:

REQUIRED FEATURE

- PROJECT LOCATION AND CONSTRUCTION LIMITS

SHEET NUMBER

C-03,C-05,C-10,C-15,C-20,C-25,C-30,C-35
C-05,C-10,C-15,C-20,C-25,C-30,C-35 C-06,C-11,C-16,C-21,C-26,C-31,C-36
C-02 C-05,C-10,C-15,C-20,C-25,C-30,C-35 C-05,C-10,C-15,C-20,C-25,C-30,C-35 C-03 C-05,C-10,C-15,C-20,C-25,C-30,C-35
C-03
C-05,C-10,C-15,C-20,C-25,C-30,C-35 C-05,C-10,C-15,C-20,C-25,C-30,C-35
C-04

- EXISTING AND FINAL GRADES, INCLUDING DRAINAGE AREA BOUNDARIES, DIRECTIONS OF FLOW AND ALL DISCHARGE POINTS WHERE STORMWATER IS LEAVING THE SITE OR ENTERING A SURFACE WATER
- SOIL TYPES AT THE SITE
- LOCATIONS OF IMPERVIOUS SURFACES
- LOCATIONS OF AREAS NOT BE DISTURBED (E.G., BUFFER ZONES, WETLANDS, ETC.)
- LOCATIONS OF AREAS OF STEEP SLOPES
- LOCATIONS OF AREAS WHERE CONSTRUCTION WILL BE PHASED TO MINIMIZE DURATION OF EXPOSED SOILS
- PORTIONS OF THE SITE THAT DRAIN TO A PUBLIC WATER WITH DNR WORK IN WATER RESTRICTIONS FOR FISH SPAWNING TIMEFRAMES
- LOCATIONS OF ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPs AS REQUIRED IN PERMIT SECTIONS 8 THROUGH 10 AND 14 THROUGH 19
- BUFFER ZONES AS REQUIRED IN PERMIT ITEMS 9.17 AND 23.11
- LOCATIONS OF POTENTIAL POLLUTION-GENERATING ACTIVITIES IDENTIFIED IN PERMIT SECTION 12
- STANDARD DETAILS FOR EROSION AND SEDIMENT CONTROL BMPs TO BE INSTALLED AT THE SITE

4.0 BEST MANAGEMENT PRACTICES (BMPs):

4.1 EROSION PREVENTION PRACTICES:

- TEMPORARY STABILIZATION OF SOILS AND SOIL STOCKPILES: AREAS OF EXPOSED SOIL WILL BE STABILIZED WITH EROSION CONTROL BLANKET, PRESERVATION OF MATURE VEGETATION, OR EQUIVALENT MEASURES. (CSW PERMIT ITEMS 8.4, 8.5, AND 23.9)
 - SOIL STOCKPILES WILL BE STABILIZED WITH MULCH (SUCH AS STRAW MULCH, WOOD CHIPS OR OTHER APPROPRIATE MULCH) IF SLOPES ≤3H:1V ARE PRESENT COVER WITH MATERIAL (SUCH AS TARPS OR PLASTIC SHEETING), OR EQUIVALENT MEASURES.
 - TEMPORARY STOCKPILES WITHOUT SIGNIFICANT SILT, CLAY, OR ORGANIC COMPONENTS (E.G., CLEAN AGGREGATE STOCKPILES, DEMOLITION CONCRETE STOCKPILES, SAND STOCKPILES) AND THE CONSTRUCTED BASE COMPONENTS OF ROADS, PARKING LOTS, AND SIMILAR SURFACES ARE EXEMPT FROM THESE STABILIZATION REQUIREMENTS.
- DRAINAGE DITCH OR SWALE STABILIZATION: THE FOLLOWING METHODS WILL BE USED FOR STABILIZATION OF DISTURBED DITCH AND SWALE WETTED PERIMETERS: CHANNEL EROSION CONTROL BLANKET, RIPRAP, OR OTHER EQUIVALENT MEASURES. (CSW PERMIT ITEMS 8.6 THROUGH 8.8)
 - MULCH, HYDROMULCH, TACKIFIER, POLYACRYLAMIDE, OR SIMILAR EROSION PREVENTION PRACTICES WILL NOT BE USED TO STABILIZE ANY PART OF AN EXISTING STORMWATER DITCH OR SWALE.
 - THE LAST 200 LINEAL FEET OF LENGTH OF THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DITCH OR SWALE THAT DRAINS WATER FROM ANY PORTION OF THE CONSTRUCTION SITE, OR DIVERTS WATER AROUND THE SITE, WITHIN 200 LINEAL FEET FROM THE PROPERTY EDGE, OR FROM THE POINT OF DISCHARGE INTO ANY SURFACE WATER WILL BE STABILIZED WITHIN 24 HOURS AFTER CONNECTING TO A SURFACE WATER OR PROPERTY EDGE.
 - STABILIZATION OF THE REMAINING PORTIONS OF ANY TEMPORARY OR PERMANENT DITCHES OR SWALES WILL BE COMPLETED WITHIN 14 CALENDAR DAYS AFTER CONNECTING TO A SURFACE WATER OR PROPERTY EDGE AND CONSTRUCTION IN THAT PORTION OF THE DITCH HAS TEMPORARILY OR PERMANENTLY CEASED.
- PIPE OUTLET ENERGY DISSIPATION: THE FOLLOWING METHODS WILL BE USED FOR ENERGY DISSIPATION AT PIPE OUTLETS: RIP RAP OR EQUIVALENT MEASURES. (CSW PERMIT ITEM 8.9)
- EROSION PREVENTION IMPLEMENTATION TIMELINES: WHERE REQUIRED, STABILIZATION OF EXPOSED SOIL AREAS (INCLUDING STOCKPILES) MUST BE INITIATED IMMEDIATELY TO LIMIT SOIL EROSION WHENEVER ANY CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE AND WILL NOT RESUME FOR A PERIOD EXCEEDING 7 CALENDAR DAYS. (CSW PERMIT ITEMS 5.4, 8.4 THROUGH 8.6, AND 23.9)
 - THE FOLLOWING ACTIVITIES CAN BE TAKEN TO INITIATE STABILIZATION:
 - PREPPING THE SOIL FOR VEGETATIVE OR NON-VEGETATIVE STABILIZATION
 - APPLYING MULCH OR OTHER NON-VEGETATIVE PRODUCT TO THE EXPOSED SOIL AREA
 - SEEDING OR PLANTING THE EXPOSED AREA
 - FINALIZING ARRANGEMENTS TO HAVE STABILIZATION PRODUCT FULLY INSTALLED
 - BEFORE LAND DISTURBING ACTIVITIES BEGIN, THE LIMITS OF THE AREAS TO BE DISTURBED DURING CONSTRUCTION WILL BE DELINEATED (E.G., WITH FLAGS, STAKES, SIGNS, SILT FENCE, ETC.).
 - FOR ALL EXPOSED SOIL AREAS THAT ARE WITHIN 200 FEET OF THE WATER'S EDGE AND DRAIN TO KINGSBURY CREEK (PUBLIC WATERS FOR WHICH THE DNR HAS PROMULGATED "WORK IN WATER RESTRICTIONS" DURING SPECIFIED FISH SPAWNING TIME FRAMES), STABILIZATION ACTIVITIES WILL BE COMPLETED WITHIN 24 HOURS DURING THE RESTRICTION PERIODS APRIL 1-JUNE 30.
 - FOR ALL EXPOSED SOIL AREAS THAT DRAIN TO A DISCHARGE POINT THAT IS WITHIN ONE MILE (AERIAL RADIUS MEASUREMENT) OF UNNAMED CREEKS TO KINGSBURY CREEK AND KINGSBURY CREEK AND FLOWS TO LAKE SUPERIOR, STABILIZATION ACTIVITIES WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE TEMPORARILY OR PERMANENTLY CEASES.
- ADDITIONAL EROSION PREVENTION MEASURES: THE FOLLOWING ADDITIONAL EROSION PREVENTION METHODS WILL BE IMPLEMENTED AT THE SITE DURING CONSTRUCTION. (CSW PERMIT ITEMS 8.2, 8.3, AND 8.10)
 - CONSTRUCTION PHASING WILL BE UTILIZED TO MINIMIZE THE AREA OF SOIL EXPOSED AT ANY ONE TIME.
 - SOIL DISTURBANCE WILL BE MINIMIZED WHEREVER POSSIBLE TO AID IN EROSION PREVENTION.
 - EXISTING VEGETATION WILL BE PRESERVED WHERE POSSIBLE TO LIMIT EXPOSED SOIL AND THUS WILL SERVE AS NATURAL VEGETATIVE BUFFERS.
 - EXPOSED SOIL ON STEEP SLOPES (≤3H:1V) WILL BE STABILIZED USING MULCH, WOOD CHIPS OR OTHER APPROPRIATE MULCH.
- PROTECTION OF INFILTRATION AREAS: NOT APPLICABLE; NO INFILTRATION AREAS WILL BE CONSTRUCTED AS PART OF THE PROJECT. (CSW PERMIT ITEMS 16.4 AND 16.5)

4.2 SEDIMENT CONTROL PRACTICES:

- DOWNGRADIENT PERIMETER CONTROLS: SEDIMENT CONTROL PRACTICES WILL BE ESTABLISHED ON ALL DOWNGRADIENT PERIMETERS AND LOCATED UPGRADIENT OF ANY BUFFER ZONES. PERIMETER SEDIMENT CONTROLS THAT MAY BE USED INCLUDE: SILT FENCING, BIOROLLS (FILLED WITH COMPOST, WOOD CHIPS, ROCK, ETC.), OTHER NATIVE MATERIAL BUFFERS, VEGETATIVE BUFFERS (RETAIN EXISTING VEGETATION WHERE POSSIBLE), ROCK CHECKS, OR EQUIVALENT MEASURES. (CSW PERMIT ITEMS 9.2 THROUGH 9.6)
 - PERIMETER SEDIMENT CONTROL PRACTICES MUST BE INSTALLED BEFORE ANY UPGRADIENT LAND DISTURBING ACTIVITIES BEGIN AND REMAIN IN PLACE UNTIL PERMANENT COVER HAS BEEN ESTABLISHED.
 - IF SEDIMENT CONTROL PRACTICES HAVE BEEN ADJUSTED OR REMOVED TO ACCOMMODATE SHORT TERM ACTIVITIES (SUCH AS CLEARING, GRUBBING, OR PASSAGE OF VEHICLES), THE CONTROLS MUST BE RE-INSTALLED IMMEDIATELY AFTER THE SHORT TERM ACTIVITY HAS BEEN COMPLETED. SEDIMENT CONTROL PRACTICES MUST BE RE-INSTALLED BEFORE THE NEXT PRECIPITATION EVENT, EVEN IF THE SHORT TERM ACTIVITY IS NOT COMPLETE.
 - IF THE DOWNGRADIENT SEDIMENT CONTROLS ARE OVERLOADED (BASED ON FREQUENT FAILURE OR EXCESSIVE MAINTENANCE REQUIREMENT), INSTALL ADDITIONAL UPGRADIENT SEDIMENT CONTROL PRACTICES OR REDUNDANT BMPs TO ELIMINATE THE OVERLOADING AND AMEND THE SWPPP TO IDENTIFY THESE ADDITIONAL PRACTICES.
- SOIL STOCKPILE PERIMETER CONTROLS: ANY TEMPORARY SOIL STOCKPILES WILL BE SURROUNDED BY SILT FENCE, BIOROLLS, OR OTHER EFFECTIVE SEDIMENT CONTROLS AND WILL NOT BE PLACED IN ANY NATURAL BUFFERS OR SURFACE WATERS. (CSW PERMIT ITEMS 9.9 AND 9.10)
- STORM DRAIN INLET PROTECTION: NOT APPLICABLE. STORM DRAIN INLETS ARE NOT PRESENT WITHIN THE PROJECT BOUNDARIES. (CSW PERMIT ITEMS 9.7 AND 9.8)
- VEHICLE TRACKING BMPs: A VEHICLE TRACKING BMP ROCK PADS, MUD MATS, OR AN EQUIVALENT MEASURE WILL BE INSTALLED TO MINIMIZE THE TRACKING OUT OF SEDIMENT FROM THE CONSTRUCTION AREA. IF SUCH VEHICLE TRACKING BMPs ARE NOT ADEQUATE TO PREVENT SEDIMENT FROM BEING TRACKED ONTO THE PAVED ROAD, STREET SWEEPING WILL ALSO BE EMPLOYED. SEDIMENT WILL BE REMOVED BY SWEEPING WITHIN 24 HOURS. (CSW PERMIT ITEMS 9.11 AND 9.12)
- PROTECTION OF INFILTRATION AREAS: NOT APPLICABLE; INFILTRATION AREAS ARE NOT PLANNED AS PART OF THIS PROJECT. (CSW PERMIT ITEMS 16.4 AND 16.5)
- MINIMIZATION OF SOIL COMPACTION AND PRESERVATION OF TOPSOIL: SOIL COMPACTION WILL BE MINIMIZED AND TOPSOIL WILL BE PRESERVED WHERE POSSIBLE. (CSW PERMIT ITEMS 5.24, 9.14, AND 9.15)
- DIRECT DISCHARGE TO VEGETATED AREAS: DISCHARGES FROM BMPs WILL BE DIRECTED TO VEGETATED AREAS OF THE SITE (INCLUDING ANY NATURAL BUFFERS) IN ORDER TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORMWATER INFILTRATION. IF

- EROSION IS NOTED TO OCCUR AS THE RESULT OF SUCH A DISCHARGE, VELOCITY DISSIPATION BMPs WILL BE CONSIDERED AND INSTALLED AS NECESSARY TO PREVENT EROSION. (CSW PERMIT ITEM 9.16)
- BUFFER ZONE OR REDUNDANT SEDIMENT CONTROLS TO PROTECT SURFACE WATERS: A 50-FOOT NATURAL BUFFER IS REQUIRED BETWEEN THE PROJECT'S SOIL DISTURBANCE AND A SURFACE WATER. ALTERNATIVELY, REDUNDANT SEDIMENT CONTROLS MUST BE PLACED IF A BUFFER IS INFEASIBLE. (CSW PERMIT ITEM 9.17)
 - A 100-FOOT NATURAL BUFFER WILL BE PRESERVED IN CONSTRUCTION AREAS DISCHARGING TO SPECIAL WATERS WHERE FEASIBLE. IN AREAS DISCHARGING TO SPECIAL WATERS WHERE 100-FOOT NATURAL BUFFER ARE INFEASIBLE REDUNDANT SEDIMENT CONTROLS WILL BE PROVIDED WHERE POSSIBLE.
 - SEDIMENT TREATMENT CHEMICALS: NOT APPLICABLE; USE OF SEDIMENT TREATMENT CHEMICALS IS NOT ANTICIPATED AS PART OF THE PROJECT. (CSW PERMIT ITEMS 5.22 AND 9.18)
 - TEMPORARY SEDIMENT BASIN(S): THIS PROJECT WILL BE PHASED SO 5 OR MORE ACRES OF SOIL THAT DRAINS TO A COMMON LOCATION THAT IS WITHIN 1 MILE OF A SPECIAL OR IMPAIRED WATER, WILL NOT BE DISTURBED AT ANY GIVEN TIME. THEREFORE, A TEMPORARY SEDIMENTATION BASIN IS NOT REQUIRED. (CSW PERMIT ITEMS 5.6, 9.13, AND 23.10 AND SECTION 14)

4.3 DEWATERING AND BASIN DRAINING: DEWATERING MAY BE CONDUCTED AS PART OF THE PROJECT TO ALLOW RESTORATION OF STREAM SEGMENTS. DEWATERING WOULD CONSIST OF ROUTING STREAM FLOW UPSTREAM OF THE CONSTRUCTION BOUNDARY PAST A STREAM RESTORATION SEGMENT AND DISCHARGE THE CLEAN STREAM FLOW DOWNSTREAM OF THE STREAM RESTORATION SEGMENT THROUGH RIPRAP. STREAM DEWATERING WILL BE VISUALLY INSPECTED TO ENSURE NUISANCE CONDITIONS WILL NOT RESULT FROM THE DISCHARGE. (CSW PERMIT SECTION 10 AND ITEM 10.5)

4.4 BMP DESIGN FACTORS: THE FOLLOWING BMP DESIGN FACTORS HAVE BEEN CONSIDERED IN DESIGNING THE TEMPORARY EROSION PREVENTION AND SEDIMENT CONTROL BMPs:

- EXPECTED AMOUNT, FREQUENCY, INTENSITY, AND DURATION OF PRECIPITATION:
 - NORMAL ANNUAL PRECIPITATION: 30.96 INCHES
 - NORMAL WETTEST MONTH: JUNE (4.23 INCHES) [BASED ON NATIONAL CLIMATIC DATA CENTER CLIMATE (NCDC) NORMALS (1981-2010) AT DULUTH INTERNATIONAL AIRPORT]
 - 1-YEAR, 24-HOUR STORM EVENT: 1YR = 2.31"
 - 2-YEAR, 24-HOUR STORM EVENT: 2YR = 2.67" [BASED ON NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES FOR THE PROJECT COORDINATES]
- NATURE OF STORMWATER RUNOFF AND RUN-ON AT THE SITE, INCLUDING FACTORS SUCH AS EXPECTED FLOW FROM IMPERVIOUS SURFACES, SLOPES, AND SITE DRAINAGE FEATURES: STORMWATER RUNOFF AND RUN-ON AT THE SITE WILL NOT CHANGE DUE TO THE PROJECT.
- STORMWATER VOLUME, VELOCITY, AND PEAK FLOW RATES TO MINIMIZE DISCHARGE OF POLLUTANTS IN STORMWATER AND TO MINIMIZE CHANNEL AND STREAMBANK EROSION AND SCOUR IN THE IMMEDIATE VICINITY OF DISCHARGE POINTS: STORMWATER FLOW IS NOT ANTICIPATED TO CHANNEL FLOW, BMPs WILL BE IMPLEMENTED TO PERFORM ANY NECESSARY STABILIZATION.
- RANGE OF SOIL PARTICLE SIZES EXPECTED TO BE PRESENT: NATIVE SOILS ARE PRIMARILY SILTY-CLAY.

4.5 BMP QUANTITIES: ANTICIPATED EROSION PREVENTION AND SEDIMENT CONTROL BMP QUANTITIES NEEDED FOR THE LIFE OF THE PROJECT: 2,990 FEET OF BIO-LOG, 48,950 SF OF EROSION CONTROL BLANKET, AND 1.12 AC FOR SEEDING.

ISSUED FOR BID
NOT FOR CONSTRUCTION

(SEE PAGE 2 OF 2)



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I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly licensed professional engineer under the laws of the state of Minnesota.
 Name: JESSICA C. L. OLSON License #: 43102
 Date: -

Operations Services
 Safety
 Facilities
 Materials
 Equipment
 Field Operations
 Information Management

KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: STORMWATER POLLUTION PREVENTION PLAN (1 of 2)
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-01**
 CC2: -
 File #: -

5.0 PERMANENT STORMWATER MANAGEMENT SYSTEM:

5.1 A PERMANENT STORMWATER TREATMENT SYSTEM IS NOT REQUIRED

6.0 INSPECTION AND MAINTENANCE ACTIVITIES:

6.1 PERSONS WITH REQUIRED TRAINING: TRAINED INDIVIDUALS INCLUDE THOSE PARTIES RESPONSIBLE FOR INSTALLING, SUPERVISING, REPAIRING, INSPECTING, AND MAINTAINING EROSION PREVENTION AND SEDIMENT CONTROL BMPs AT THE SITE. TRAINED INDIVIDUALS ARE ALSO RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP AND COMPLIANCE WITH THE GENERAL PERMIT UNTIL THE CONSTRUCTION ACTIVITIES ARE COMPLETE, PERMANENT COVER HAS BEEN ESTABLISHED, AND A NOTICE OF TERMINATION (NOT) HAS BEEN SUBMITTED. (CSW PERMIT ITEMS 5.20, 5.21, AND 11.9 AND SECTION 21)

THESE INDIVIDUALS WILL BE TRAINED IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL PERMIT, INCLUDING THE REQUIREMENT THAT THE CONTENT AND EXTENT OF TRAINING WILL BE COMMENSURATE WITH THE INDIVIDUAL'S JOB DUTIES AND RESPONSIBILITIES.

BELOW IS A LIST OF PEOPLE RESPONSIBLE FOR THIS PROJECT WHO ARE KNOWLEDGEABLE AND EXPERIENCED IN THE APPLICATION OF EROSION PREVENTION AND SEDIMENT CONTROL BMPs.

TRAINED INDIVIDUAL	RESPONSIBILITY	TRAINING ENTITY*	TRAINING DATE
Heather Zika, Barr Engineering [INSERT NAME]	PREPARATION OF THE SWPPP OVERSIGHT OF SWPPP IMPLEMENTATION, REVISION, AND AMMENDMENT	Barr Engineering Co. [INSERT ENTITY]	4/13/2021 [INSERT DATE]
[INSERT NAME]	PERFORMANCE OF SWPPP INSPECTIONS	[INSERT ENTITY]	[INSERT DATE]
[INSERT NAME]	PERFORMANCE OR SUPERVISION OF INSTALLATION, MAINTENANCE, AND REPAIR OF BMPs	[INSERT ENTITY]	[INSERT DATE]

*TRAINING DOCUMENTATION AVAILABLE UPON REQUEST.

6.2 FREQUENCY OF INSPECTIONS: A TRAINED PERSON WILL ROUTINELY INSPECT THE ENTIRE CONSTRUCTION SITE. (CSW PERMIT ITEMS 11.2, 11.10, AND 23.13)

- AT LEAST ONCE EVERY 7 DAYS DURING ACTIVE CONSTRUCTION
- WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS

INSPECTION FREQUENCY MAY BE ADJUSTED UNDER THE FOLLOWING CIRCUMSTANCES:

- WHERE PARTS OF THE CONSTRUCTION AREAS HAVE PERMANENT COVER, BUT WORK REMAINS ON OTHER PARTS OF THE SITE, INSPECTIONS OF THE AREAS WITH PERMANENT COVER MAY BE REDUCED TO ONCE PER MONTH.
- WHERE CONSTRUCTION AREAS HAVE PERMANENT COVER AND NO CONSTRUCTION ACTIVITY IS OCCURRING ON THE SITE, INSPECTIONS CAN BE REDUCED TO ONCE PER MONTH AND, AFTER 12 MONTHS, MAY BE SUSPENDED COMPLETELY UNTIL CONSTRUCTION ACTIVITY RESUMES.
- WHERE CONSTRUCTION ACTIVITY HAS BEEN SUSPENDED DUE TO FROZEN GROUND CONDITIONS, THE INSPECTIONS MAY BE SUSPENDED. THE REQUIRED INSPECTIONS AND MAINTENANCE SCHEDULE MUST BEGIN WITHIN 24 HOURS AFTER RUNOFF OCCURS AT THE SITE OR UPON RESUMING CONSTRUCTION, WHICHEVER COMES FIRST.

6.3 INSPECTION REQUIREMENTS: EACH CONSTRUCTION STORMWATER SITE INSPECTION WILL INCLUDE INSPECTION OF THE FOLLOWING AREAS: (CSW PERMIT ITEMS 11.3 THROUGH 11.8)

- ALL EROSION PREVENTION AND SEDIMENT CONTROL BMPs AND POLLUTION PREVENTION MANAGEMENT MEASURES
- SURFACE WATERS FOR EVIDENCE OF EROSION AND SEDIMENT DEPOSITION
- CONSTRUCTION SITE VEHICLE EXIT LOCATIONS FOR EVIDENCE OF OFFSITE SEDIMENT TRACKING
- STREETS AND OTHER AREAS ADJACENT TO THE PROJECT FOR EVIDENCE OF OFF SITE ACCUMULATIONS OF SEDIMENT

6.4 MAINTENANCE REQUIREMENTS: MAINTENANCE OF THE FOLLOWING AREAS AND BMPs WILL BE PERFORMED AS FOLLOWS: (CSW PERMIT ITEMS 11.3 THROUGH 11.8)

- NONFUNCTIONAL BMPs WILL BE REPAIRED, REPLACED, OR SUPPLEMENTED WITH FUNCTIONAL BMPs BY THE END OF THE NEXT BUSINESS DAY AFTER DISCOVERY OR AS SOON AS FIELD CONDITIONS ALLOW ACCESS.
- PERIMETER CONTROL DEVICES WILL BE REPAIRED, REPLACED, OR SUPPLEMENTED WHEN THEY BECOME NONFUNCTIONAL OR THE SEDIMENT REACHES 1/2 OF THE HEIGHT OF THE DEVICE.
- TEMPORARY AND PERMANENT SEDIMENTATION BASINS WILL BE DRAINED AND THE SEDIMENT REMOVED WHEN THE DEPTH OF SEDIMENT COLLECTED IN THE BASIN REACHES 1/2 THE STORAGE VOLUME.
- DELTA AND SEDIMENT DEPOSITED IN SURFACE WATERS WILL BE REMOVED, AND THE AREAS WHERE SEDIMENT REMOVAL RESULTS IN EXPOSED SOIL WILL BE RE-STABILIZED. THE REMOVAL AND STABILIZATION WILL BE COMPLETED WITHIN 7 CALENDAR DAYS OF DISCOVERY UNLESS PRECLUDED BY LEGAL, REGULATORY, OR PHYSICAL ACCESS CONSTRAINTS. IF PRECLUDED DUE TO ACCESS CONSTRAINTS, REASONABLE EFFORTS TO OBTAIN ACCESS WILL BE USED. REMOVAL AND STABILIZATION WILL TAKE PLACE WITHIN 7 CALENDAR DAYS OF OBTAINING ACCESS.
- TRACKED SEDIMENT ON PAVED SURFACES WILL BE REMOVED WITHIN 1 CALENDAR DAY OF DISCOVERY.
- AREAS UNDERGOING STABILIZATION WILL BE RESTABILIZED AS NECESSARY TO ACHIEVE REQUIRED COVER.

6.5 RECORDKEEPING REQUIREMENTS: (CSW PERMIT ITEMS 11.11 AND 24.5 AND SECTIONS 6 AND 20)

- ALL INSPECTIONS AND MAINTENANCE ACTIVITIES WILL BE RECORDED IN WRITING WITHIN 24 HOURS OF BEING CONDUCTED AND THESE RECORDS WILL BE RETAINED WITH THE SWPPP. RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY WILL INCLUDE THE DATE AND TIME; NAME OF INSPECTOR(S); FINDINGS OF INSPECTIONS; CORRECTIVE ACTIONS (INCLUDING DATES, TIMES, AND PARTY COMPLETING MAINTENANCE ACTIVITIES); AND DATE OF ALL RAINFALL EVENTS GREATER THAN 0.5 INCHES IN 24 HOURS AND THE AMOUNT OF RAINFALL FOR EACH EVENT.
 - IF ANY DISCHARGE IS OBSERVED DURING THE INSPECTION, THE LOCATION AND APPEARANCE OF THE DISCHARGE (I.E., COLOR, ODOR, SETTLED OR SUSPENDED SOLIDS, OIL SHEEN, AND OTHER OBVIOUS INDICATORS OF POLLUTANTS) WILL BE DOCUMENTED AND A PHOTOGRAPH WILL BE TAKEN.
- THE SWPPP WILL BE AMENDED TO INCLUDE ADDITIONAL OR MODIFIED BMPs TO CORRECT PROBLEMS OR ADDRESS SITUATIONS WHENEVER THERE IS A CHANGE IN DESIGN, CONSTRUCTION, OPERATION, MAINTENANCE, WEATHER, OR SEASONAL CONDITIONS THAT HAS A SIGNIFICANT EFFECT ON THE DISCHARGE OF POLLUTANTS TO SURFACE WATERS OR GROUNDWATER.
 - THE SWPPP WILL BE AMENDED WHEN INSPECTIONS OR INVESTIGATIONS BY THE SITE OWNER, OPERATOR, OR CONTRACTORS OR BY USEPA/MPCA OFFICIALS INDICATE THAT THE SWPPP IS NOT EFFECTIVE IN ELIMINATING OR MINIMIZING THE DISCHARGE OF POLLUTANTS TO SURFACE WATERS OR GROUNDWATER;

- THE DISCHARGES ARE CAUSING WATER QUALITY STANDARD EXCEEDANCES; OR THE SWPPP IS NOT CONSISTENT WITH A USEPA APPROVED TMDL.
 - ANY AMENDMENTS TO THE SWPPP PROPOSED AS A RESULT OF THE INSPECTION WILL BE DOCUMENTED AS REQUIRED WITHIN 7 CALENDAR DAYS.
 - AMENDMENTS WILL BE COMPLETED BY AN APPROPRIATELY TRAINED INDIVIDUAL. CHANGES INVOLVING THE USE OF A LESS STRINGENT BMP WILL INCLUDE A JUSTIFICATION DESCRIBING HOW THE REPLACEMENT BMP IS EFFECTIVE FOR THE SITE CHARACTERISTICS.
- RECORDS RETENTION: THE SWPPP, INCLUDING ALL CHANGES TO IT, AND INSPECTION AND MAINTENANCE RECORDS WILL BE KEPT AT THE SITE DURING CONSTRUCTION BY THE PERMITTEE WHO HAS OPERATIONAL CONTROL OF THE SITE. THE SWPPP CAN BE KEPT IN EITHER A FIELD OFFICE OR IN AN ON SITE VEHICLE DURING NORMAL WORKING HOURS.
 - RECORD AVAILABILITY: THE PERMITTEES WILL MAKE THE SWPPP, INCLUDING INSPECTION REPORTS, MAINTENANCE RECORDS, AND TRAINING RECORDS, AVAILABLE TO FEDERAL, STATE, AND LOCAL OFFICIALS WITHIN THREE DAYS UPON REQUEST FOR THE DURATION OF THE PERMIT COVERAGE AND FOR THREE YEARS FOLLOWING THE NOTICE OF TERMINATION.

7.0 POLLUTION PREVENTION MEASURES:

- ANY CONSTRUCTION PRODUCTS AND LANDSCAPE MATERIALS THAT HAVE THE POTENTIAL TO LEACH POLLUTANTS WILL BE STORED UNDER COVER (E.G., PLASTIC SHEETING OR TEMPORARY ROOFS) TO PREVENT DISCHARGE OF POLLUTANTS THROUGH MINIMIZATION OF CONTACT WITH STORMWATER. STORAGE OF SUCH MATERIALS WITHIN THE PROJECT AREA WILL BE MINIMIZED TO THE EXTENT POSSIBLE. (CSW PERMIT ITEM 12.2)
- PESTICIDES, FERTILIZERS, AND TREATMENT CHEMICALS WILL BE STORED UNDER COVER (E.G., PLASTIC SHEETING, TEMPORARY ROOFS, WITHIN A BUILDING, OR IN WEATHER-PROOF CONTAINERS) TO PREVENT DISCHARGE OF POLLUTANTS THROUGH MINIMIZATION OF CONTACT WITH STORMWATER. STORAGE OF SUCH MATERIALS WITHIN THE PROJECT AREA WILL BE MINIMIZED TO THE EXTENT POSSIBLE. (CSW PERMIT ITEM 12.3)
- HAZARDOUS MATERIALS AND TOXIC WASTE (E.G., OIL, DIESEL FUEL, GASOLINE, HYDRAULIC FLUIDS, PAINT SOLVENTS, PETROLEUM-BASED PRODUCTS, WOOD PRESERVATIVES, ADDITIVES, CURING COMPOUNDS, AND ACIDS) WILL BE STORED AND DISPOSED OF IN COMPLIANCE WITH MINNESOTA RULES CHAPTER 7045, INCLUDING SECONDARY CONTAINMENT (AS APPLICABLE). HAZARDOUS MATERIALS WILL BE PROPERLY STORED IN SEALED CONTAINERS TO PREVENT SPILLS, LEAKS, OR OTHER DISCHARGES AND PREVENT PRECIPITATION FROM FALLING ONTO THE CONTAINERS OR STORED HAZARDOUS MATERIALS. (CSW PERMIT ITEMS 2.3 AND 12.4)
- SOLID WASTE WILL BE COLLECTED, STORED, AND DISPOSED OF PROPERLY IN COMPLIANCE WITH MINNESOTA RULES CHAPTER 7035. THIS INCLUDES STORAGE WITHIN COVERED TRASH CONTAINERS AND DAILY REMOVAL OF LITTER AND DEBRIS. STORAGE OF SOLID WASTE WITHIN THE PROJECT AREA WILL BE MINIMIZED TO THE EXTENT POSSIBLE. (CSW PERMIT ITEM 12.5)
- PORTABLE TOILETS WILL BE LOCATED AWAY FROM SURFACE WATERS AND POSITIONED AND SECURED TO THE GROUND SO THEY WILL NOT BE TIPPED OR KNOCKED OVER. SANITARY WASTE WILL BE DISPOSED OF IN ACCORDANCE WITH MINNESOTA RULES, CHAPTER 7041. PORTABLE TOILETS WILL BE PERIODICALLY EMPTIED AND THE WASTE HAULED OFF-SITE BY A LICENSED HAULER. (CSW PERMIT ITEM 12.6)
- VEHICLE FUELING WILL ONLY OCCUR IN DESIGNATED AREAS. SPILL KITS SIZED APPROPRIATELY FOR THE AMOUNT OF REFUELING TAKING PLACE WILL BE LOCATED. SPILL KITS WILL BE CLEARLY LABELED AND CONTAIN MATERIALS TO ASSIST IN SPILL CLEANUP INCLUDING ABSORBENT PADS, BOOMS FOR CONTAINING SPILLS, AND HEAVY-DUTY PROTECTIVE GLOVES. SPILLS WILL BE REPORTED TO THE MINNESOTA DUTY OFFICER AS REQUIRED BY MINNESOTA STATUTES, SECTION 115.061. (CSW PERMIT ITEMS 2.3 AND 12.7)
 - ANY FUEL TANKS BROUGHT ON-SITE WILL HAVE PROPERLY SIZED CONTAINMENT AND WILL NOT BE TOPPED OFF TO AVOID SPILLS FROM OVERFILLING. FUEL TANKS WILL MEET INDUSTRY STANDARDS (DESIGNED TO HOLD FUEL TYPE, PROPERLY MAINTAINED, NOT ILLEGALLY MODIFIED, NOT MISSING LEAK INDICATOR FLOATS FOR DOUBLE WALLED TANKS, SIGHT GAUGES NOT USED, ETC.) OR BE REMOVED FROM THE WORK AREA.
 - GUIDELINES FOR SPILL PREVENTION AND RESPONSE INCLUDE:
 - TAKE REASONABLE STEPS TO PREVENT THE DISCHARGE OF SPILLED OR LEAKED CHEMICALS, INCLUDING FUEL, FROM ANY AREA WHERE CHEMICALS OR FUEL WILL BE LOADED OR UNLOADED, INCLUDING THE USE OF DRIP PANS OR ABSORBENTS UNLESS INFEASIBLE;
 - PERFORM REGULAR PREVENTATIVE MAINTENANCE ON TANKS AND FUEL LINES;
 - INSPECT PUMPS, CYLINDERS, HOSES, VALVES, AND OTHER MECHANICAL EQUIPMENT ON-SITE FOR DAMAGE OR DETERIORATION;
 - DO NOT WASH OR RINSE FUELING AREAS WITH WATER;
 - MAINTAIN ADEQUATE SUPPLIES TO CLEAN UP DISCHARGED MATERIALS AND PROVIDE AN APPROPRIATE DISPOSAL METHOD FOR RECOVERED SPILLED MATERIALS;
 - REPORT AND CLEAN UP SPILLS IMMEDIATELY AS REQUIRED BY MINNESOTA STATUTES, SECTION 115.061, USING DRY CLEAN UP MEASURES WHERE POSSIBLE; AND
 - MAINTAIN COPIES OF SAFETY DATA SHEETS (SDSS) FOR HAZARDOUS MATERIALS ON-SITE IN LOCATIONS READILY AVAILABLE TO EMERGENCY RESPONDERS.
- IF VEHICLE AND EQUIPMENT WASHING IS NECESSARY, A VEHICLE WASH STATION WILL BE LOCATED IN A DESIGNATED AREA. RUNOFF FROM THE WASHING AREA WILL BE CONTAINED IN A SEDIMENT BASIN AND WASTE FROM THE WASHING ACTIVITY WILL BE PROPERLY DISPOSED OF. ANY SOAPS, DETERGENTS, OR SOLVENTS WILL BE PROPERLY USED AND STORED. ANY DETERGENTS AND OTHER CLEANERS NOT PERMITTED FOR DISCHARGE WILL NOT BE USED. (CSW PERMIT ITEMS 2.3 AND 12.8)
- THE PROJECT WILL NOT RESULT IN CONCRETE OR OTHER WASHOUT ACTIVITIES. IF NECESSARY, A DESCRIPTION OF THE STORAGE AND DISPOSAL OF CONCRETE AND OTHER WASHOUT WASTES SO THAT WASTES DO NOT CONTACT THE GROUND WILL BE ADDED. (CSW PERMIT ITEMS 2.3 AND 12.9)

8.0 PERMANENT COVER AND PERMIT TERMINATION CONDITIONS:

- THE AREAS DISTURBED DURING CONSTRUCTION WILL BE STABILIZED WITH PERMANENT COVER UPON COMPLETION OF WORK. PERMANENT COVER MAY BE VEGETATIVE OR NON-VEGETATIVE, AS APPROPRIATE. ESTABLISHMENT OF PERMANENT COVER MAY INCLUDE THE FOLLOWING ACTIVITIES: SEEDING, MULCHING and
 - EROSION CONTROL BLANKETS. (CSW PERMIT ITEM 5.17)
- FOR A CONSTRUCTION-SITE TO ACHIEVE "PERMANENT COVER", THE FOLLOWING REQUIREMENTS MUST BE COMPLETED PRIOR TO TERMINATION OF PERMIT COVERAGE: (CSW PERMIT SECTIONS 4 AND 13)
 - ALL SOIL DISTURBING CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED AND PERMANENT COVER HAS BEEN INSTALLED OVER ALL AREAS. VEGETATIVE COVER CONSISTS OF A UNIFORM PERENNIAL VEGETATION WITH A DENSITY OF 70% OF ITS EXPECTED FINAL GROWTH. VEGETATION IS NOT REQUIRED WHERE THE FUNCTION OF A SPECIFIC AREA DICTATES NO VEGETATION (SUCH AS IMPERVIOUS SURFACES OR THE BASE OF A SAND FILTER).
 - ALL SEDIMENT HAS BEEN REMOVED FROM CONVEYANCE SYSTEMS, INCLUDING CULVERTS.
 - ALL TEMPORARY SYNTHETIC EROSION PREVENTION AND SEDIMENT CONTROL BMPs HAVE BEEN REMOVED. BMPs DESIGNED TO DECOMPOSE ON-SITE MAY BE LEFT IN PLACE.

WITHIN 30 DAYS AFTER THE TERMINATION CONDITIONS ARE COMPLETE, A NOTICE OF TERMINATION (NOT) FORM WILL BE SUBMITTED TO THE MPCA.



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Name: JESSICA C. L. OLSON License #: 43102
Date: -

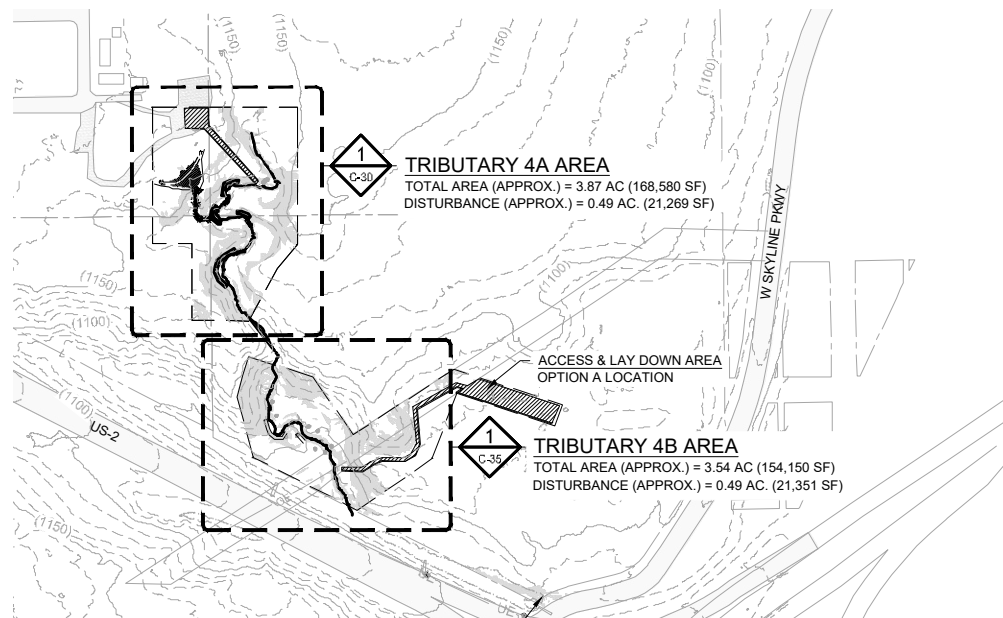
Operations Services
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Equipment
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Information Management

KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: STORMWATER POLLUTION PREVENTION PLAN (2 of 2)
Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: C-02
CC2: -
File #: -

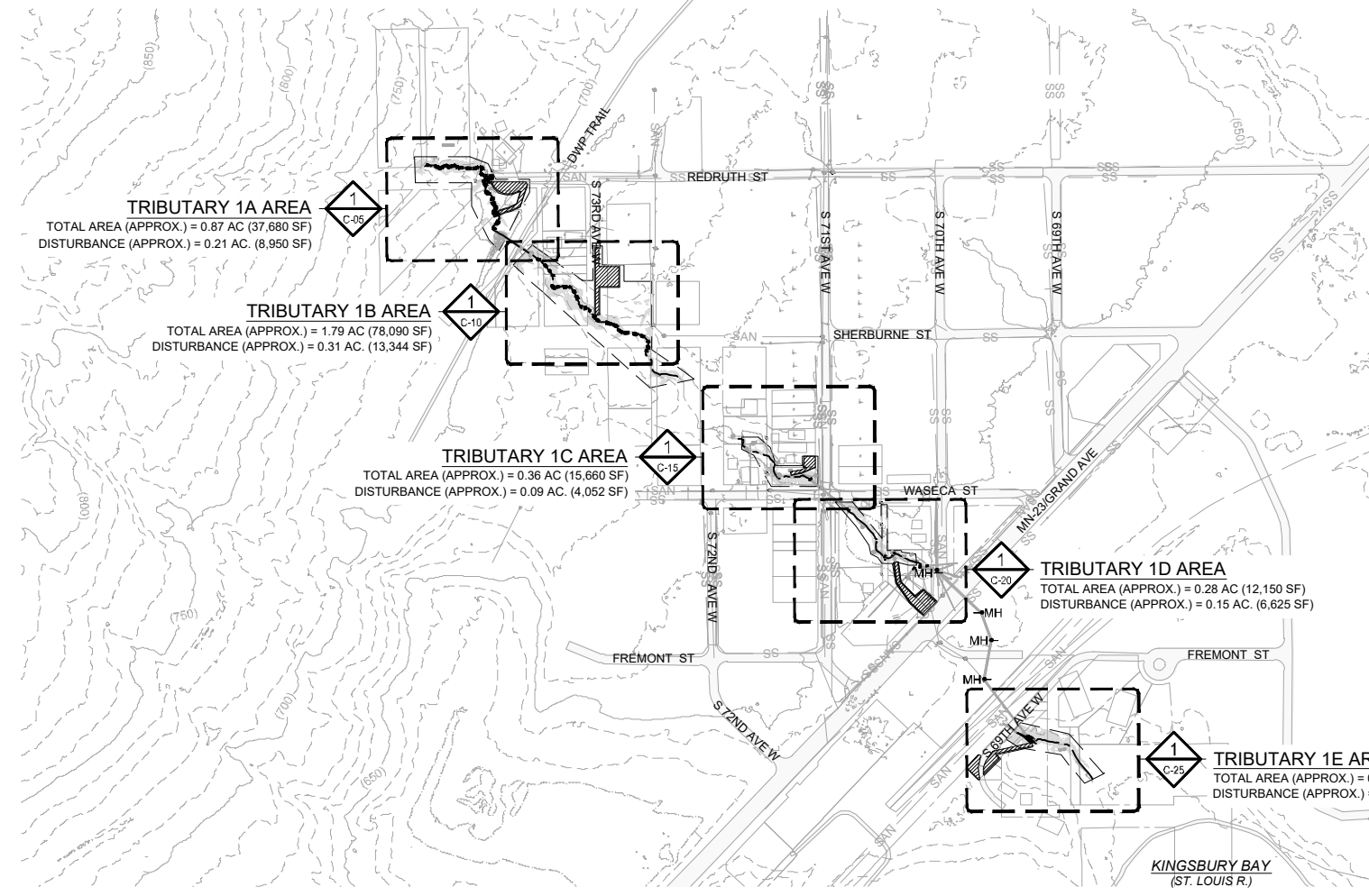


TRIBUTARY 4A AREA
 TOTAL AREA (APPROX.) = 3.87 AC (168,580 SF)
 DISTURBANCE (APPROX.) = 0.49 AC (21,269 SF)

TRIBUTARY 4B AREA
 TOTAL AREA (APPROX.) = 3.54 AC (154,150 SF)
 DISTURBANCE (APPROX.) = 0.49 AC (21,351 SF)

ACCESS & LAY DOWN AREA
 OPTION B LOCATION

LEGEND	
	(1040) EXISTING INDEX CONTOUR (50')
	EXISTING INTERMEDIATE CONTOUR (10')
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN
	ACCESS/LAYDOWN AREA
	EXISTING RIPRAP
	OE OVERHEAD ELECTRIC
	SAN UNDERGROUND SANITARY SEWER
	SS UNDERGROUND STORM SEWER
	EXISTING CULVERT
	UE UNDERGROUND ELECTRIC
	GAS UNDERGROUND GAS
	UT UNDERGROUND TELEPHONE
	X EXISTING FENCELINE
	STEEP SLOPES (3:1 AND GREATER)



TRIBUTARY 1A AREA
 TOTAL AREA (APPROX.) = 0.87 AC (37,680 SF)
 DISTURBANCE (APPROX.) = 0.21 AC (8,950 SF)

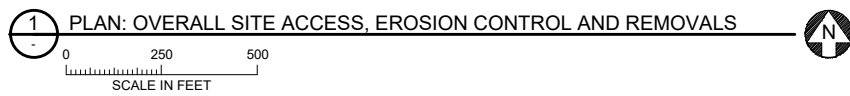
TRIBUTARY 1B AREA
 TOTAL AREA (APPROX.) = 1.79 AC (78,090 SF)
 DISTURBANCE (APPROX.) = 0.31 AC (13,344 SF)

TRIBUTARY 1C AREA
 TOTAL AREA (APPROX.) = 0.36 AC (15,660 SF)
 DISTURBANCE (APPROX.) = 0.09 AC (4,052 SF)

TRIBUTARY 1D AREA
 TOTAL AREA (APPROX.) = 0.28 AC (12,150 SF)
 DISTURBANCE (APPROX.) = 0.15 AC (6,625 SF)

TRIBUTARY 1E AREA
 TOTAL AREA (APPROX.) = 0.41 AC (18,030 SF)
 DISTURBANCE (APPROX.) = 0.15 AC (6,544 SF)

- NOTES:**
- EXISTING CONTOUR DATA IS BASED ON SURVEYS PERFORMED BY BARR ENGINEERING NOVEMBER 2020 AS SUPPLEMENTED WITH LIDAR DATA. BARR OBTAINED LIDAR DATA FROM MNDNR IN 2020.
 - EXISTING PROPERTY BOUNDARY LINES FROM PARCEL BOUNDARY SURVEY BY NORTHWESTERN SURVEYING AND ENGINEERING, APRIL 16, 2021, AND SUPPLEMENTED BY PROPERTY PARCEL LINE DATA FROM ST. LOUIS COUNTY, PROVIDED TO BARR AS RE-PROJECTED GIS SHAPEFILE, DECEMBER 29, 2020. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 - ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
 - CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
 - DISTURBANCE AREA IS APPROXIMATE, AS MEASURED PER PLAN. ADJUSTMENTS MAY BE REQUIRED PER FIELD CONDITIONS ENCOUNTERED.



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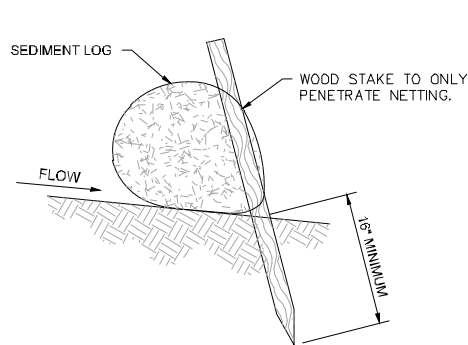
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 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
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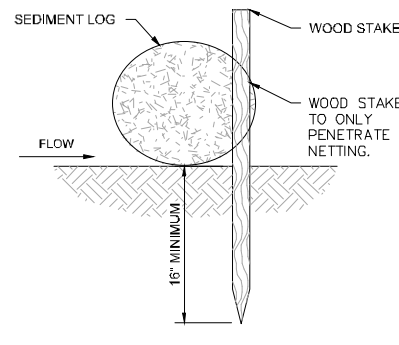
Revisions	
Date	By

Title: TRIBUTARY 1A SITE ACCESS, EROSION CONTROL AND REMOVALS
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

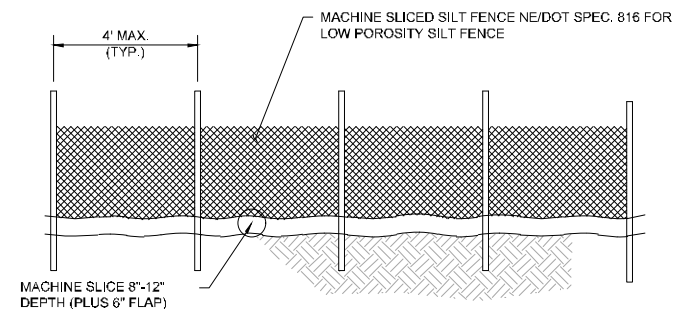
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 CC2: -
 File #: -



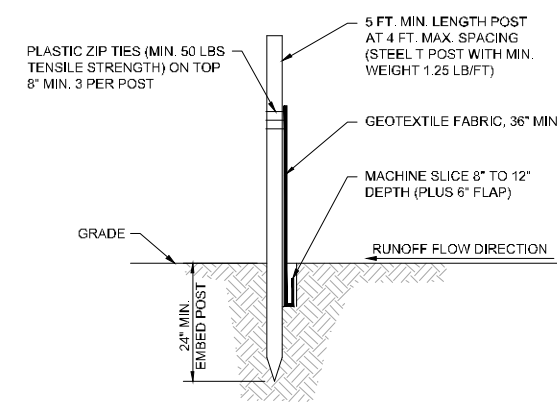
SIDE VIEW ON SLOPE



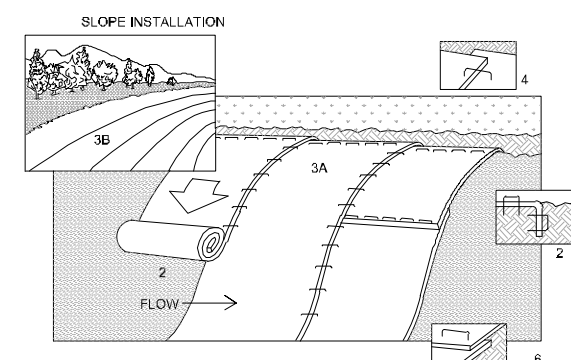
SIDE VIEW FLAT



DOWNSTREAM VIEW

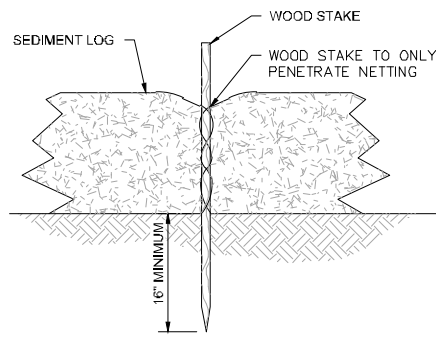


SECTION VIEW

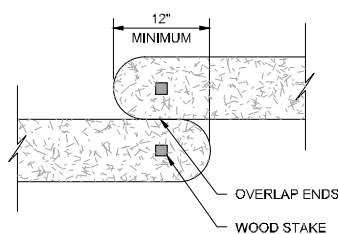


NOTES:

1. REFER TO MANUFACTURER RECOMMENDATIONS FOR STAPLE PATTERNS FOR SLOPE INSTALLATIONS.
2. PREPARE SOIL BY LOOSENING TOP 1-2 INCHES AND APPLY SEED (AND FERTILIZER WHERE REQUIRED) PRIOR TO INSTALLING BLANKETS. GROUND SHOULD BE SMOOTH AND FREE OF DEBRIS.
3. BEGIN (A) AT THE TOP OF THE SLOPE AND ROLL THE BLANKETS DOWN OR (B) AT ONE END OF THE SLOPE AND ROLL THE BLANKETS HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 6" OVERLAP, WITH THE UPHILL BLANKET ON TOP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 6" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
6. BLANKET MATERIALS SHALL BE AS SPECIFIED OR AS APPROVED BY ENGINEER.



FRONT VIEW



TOP VIEW

NOTES:

1. INSTALL SILT FENCE PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED AND MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD. REMOVE SILT FENCE AND ANY ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. SILT FENCE MATERIALS AND INSTALLATION SHALL MEET THE REQUIREMENTS OF NE/DOT SPEC. 816 FOR LOW POROSITY SILT FENCE.
3. NO HOLES OR GAPS SHALL BE PRESENT IN/UNDER SILT FENCE. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
4. REMOVE ACCUMULATED SEDIMENT WHEN BUILD UP REACHES 1/3 OF FENCE HEIGHT. OR INSTALL A SECOND SILT FENCE DOWNSTREAM OF THE ORIGINAL FENCE AT A SUITABLE DISTANCE.
5. WHEN SPLICES ARE NECESSARY MAKE SPlice AT POST ACCORDING TO SPlice DETAIL. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE. ROTATE BOTH POSTS TOGETHER AT LEAST 180 DEGREES TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL. CUT THE FABRIC NEAR THE BOTTOM OF THE POSTS TO ACCOMMODATE THE 6 INCH FLAP, THEN DRIVE BOTH POSTS AND BURY THE FLAP AND COMPACT BACKFILL.

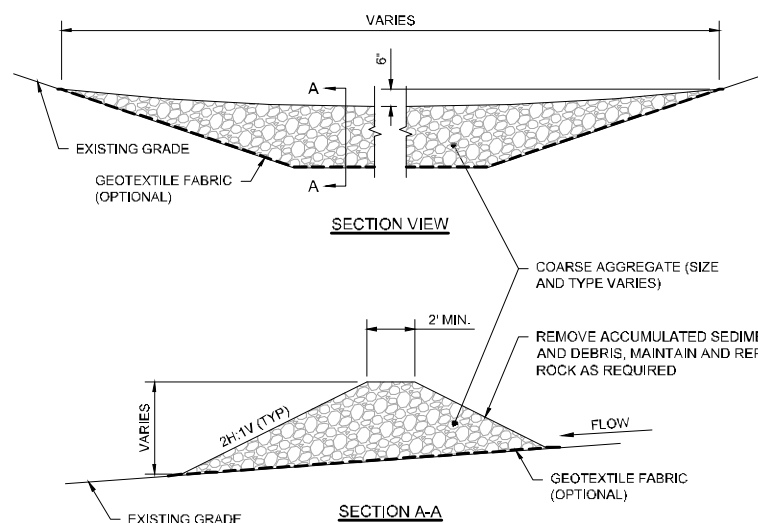
2 DETAIL: SILT FENCE - MACHINE SLICED
NOT TO SCALE

3 DETAIL: EROSION CONTROL BLANKET - INSTALLATION
NOT TO SCALE

NOTES:

1. INSTALL SEDIMENT LOG ALONG CONTOURS (CONSTANT ELEVATION).
2. NO GAPS SHALL BE PRESENT UNDER SEDIMENT LOG. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
3. REMOVE ACCUMULATED SEDIMENT WHEN REACHING 1/3 OF LOG HEIGHT.
4. MAINTAIN SEDIMENT LOG THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACED AS REQUIRED.

1 DETAIL: SEDIMENT LOG - INSTALLATION
NOT TO SCALE



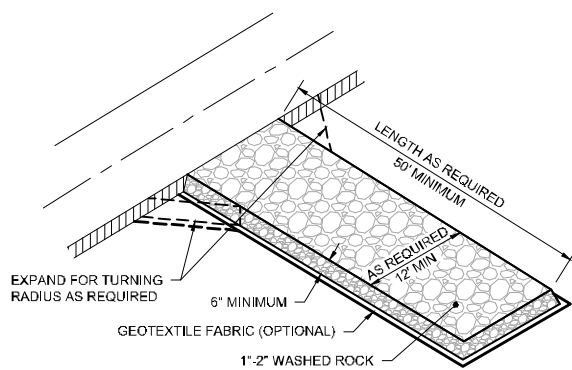
SECTION VIEW

SECTION A-A

NOTES:

1. AGGREGATE SIZE MAY VARY AND DEPENDING ON CHANNEL SIZE, FLOW, SEDIMENT LOAD OR OTHER SITE CONDITIONS. AGGREGATE USED SHOULD BE RELATIVELY FREE OF SEDIMENT PRIOR TO INSTALLATION.
2. ROCK CHECK DAM SHALL BE CLEANED OR REPLACED WHEN SEDIMENT BUILD UP REACHES 1/2 OF THE CHECK DAM HEIGHT. ALTERNATIVELY A SECOND CHECK DAM MAY BE INSTALLED DOWNSTREAM OF THE CHECK DAM AT A SUITABLE DISTANCE.
3. ROCK CHECK DAM SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ROCK, GEOTEXTILE AND ANY ACCUMULATED SEDIMENT SHALL BE REMOVED IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.

5 DETAIL: ROCK CHECK DAM
NOT TO SCALE



NOTES:

1. MAINTAIN ENTRANCE THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACE AS REQUIRED TO PREVENT TRACKING OFFSITE.
2. REMOVE ENTRANCE IN CONJUNCTION WITH FINAL GRADING AND SITE STABILIZATION.

4 DETAIL: CONSTRUCTION ENTRANCE

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Date: -

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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
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Section: 10,11,13,14 Township: 49N Range: 15W

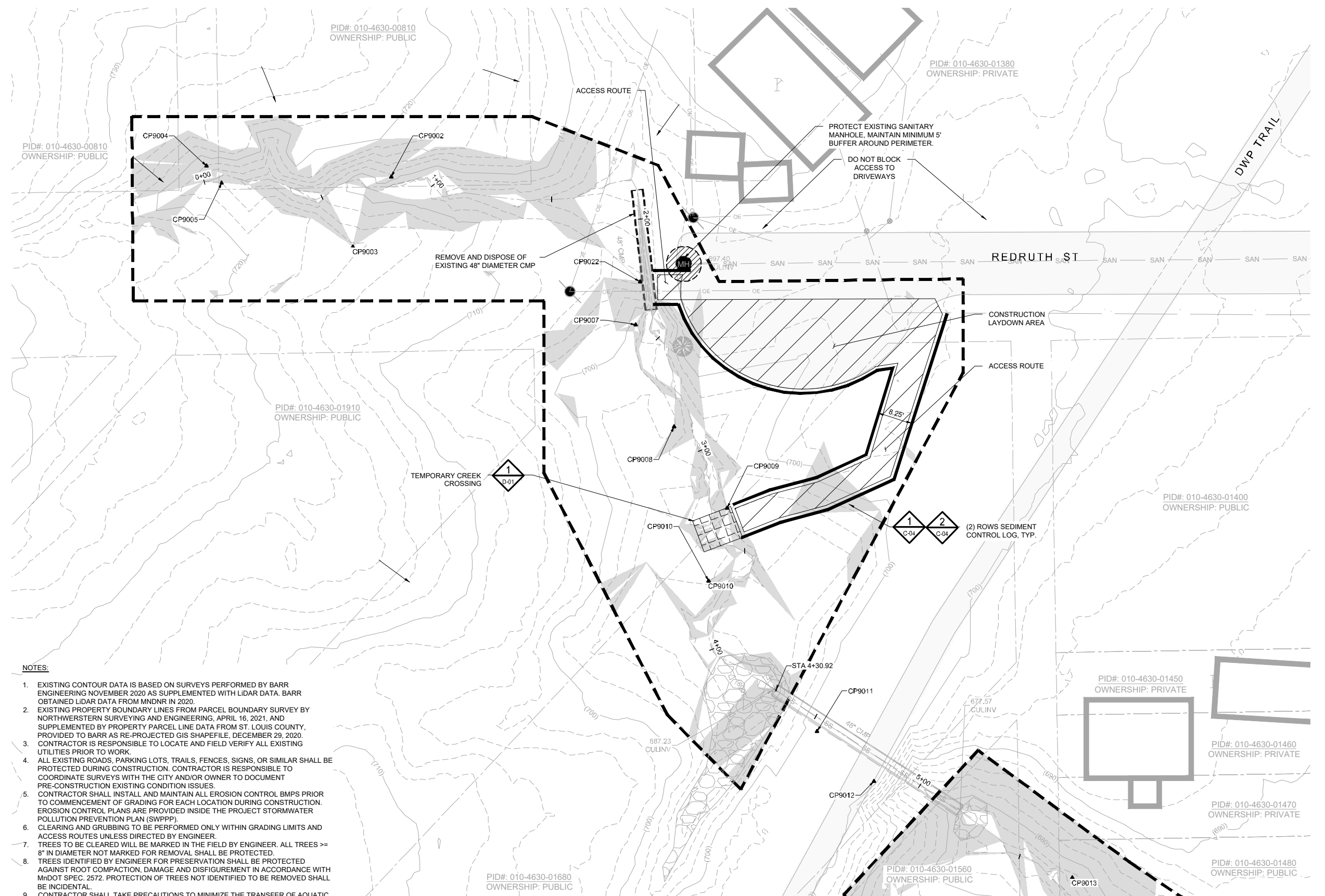
Revisions	
Date	By

Title: **EROSION CONTROL DETAILS**

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-04**

CC2: -
File #: -



LEGEND

- (1040) EXISTING INDEX CONTOUR
- - - - - EXISTING INTERMEDIATE CONTOUR
- ===== EXISTING ROAD/TRAIL (IMPERVIOUS SURFACE)
- - - - - EXISTING PROPERTY LINE
- CONSTRUCTION LIMITS
- EXISTING CHANNEL OR TRIBUTARY CENTERLINE
- [] EXISTING BUILDING OR BUILT STRUCTURE
- [] EXISTING CULVERT, SIZE & MTL. AS NOTED
- [] EXISTING TREE, TO REMAIN (AS SURVEYED)
- [] CONTROL POINT
- [] ACCESS/LAYDOWN AREA
- [] EXISTING RIPRAP
- OE OVERHEAD ELECTRIC
- SAN UNDERGROUND SANITARY MAIN
- SS UNDERGROUND STORM MAIN
- > EXISTING CULVERT
- UE UNDERGROUND ELECTRIC
- GAS UNDERGROUND GAS
- UT UNDERGROUND TELEPHONE
- X EXISTING FENCELINE
- [] SEDIMENT CONTROL LOG
- [] SLOPE STEEPER THAN 3H:1V

- NOTES:**
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 - CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
 - TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
 - TREES IDENTIFIED BY ENGINEER FOR PRESERVATION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MNDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
 - CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
 - KINGSBURY CREEK AND TRIBUTARIES TO KINGSBURY CREEK ARE LISTED AS SPECIAL WATERS. REFER TO SECTION 4.0 OF THE SWPPP FOR ADDITIONAL DETAILS.
 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

CONTROL POINTS

POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9002	CP9002	711.11	413353.30	2852314.58
9003	CP9003	716.15	413325.37	2852299.31
9004	CP9004	717.49	413357.62	2852240.66
9005	CP9005	715.71	413350.87	2852246.74
9008	CP9008	698.20	413253.33	2852427.77
9009	CP9009	695.97	413220.66	2852449.04
9010	CP9010	693.91	413191.49	2852441.62
9011	CP9011	701.61	413131.32	2852485.03
9022	CP9022	706.23	413311.31	2852414.28
9023	CP9023	706.30	413311.31	2852414.20
9024	CP9024	694.05	413191.48	2852441.69

PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88

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1 PLAN: TRIBUTARY 1A SITE ACCESS, EROSION CONTROL AND REMOVALS

0 20 40
 SCALE IN FEET



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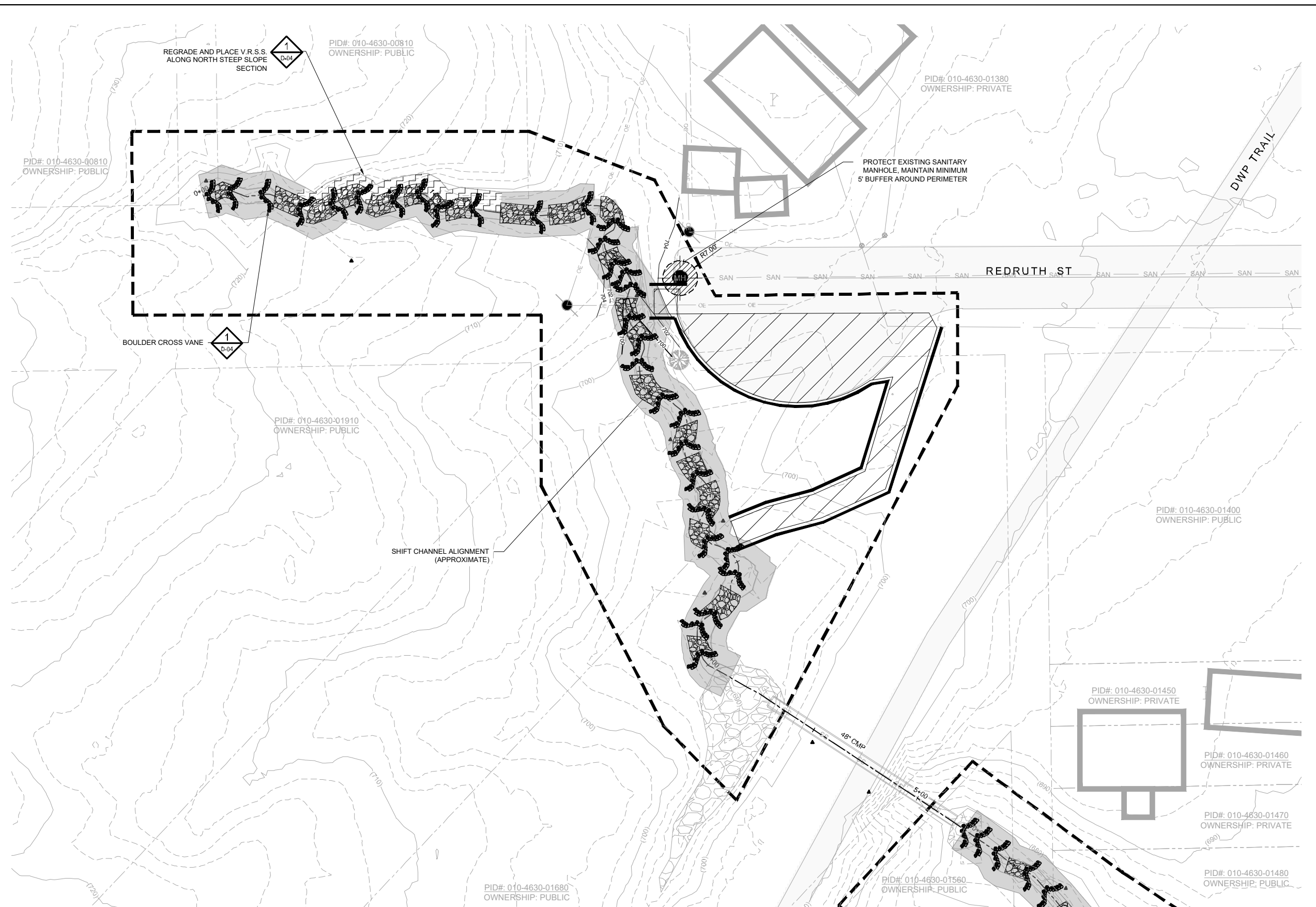
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 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

Date	By

Title: TRIBUTARY 1A SITE ACCESS, EROSION CONTROL AND REMOVALS
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-05**
 CC2: -
 File #: -

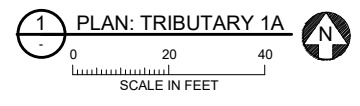


LEGEND

	(1040)	EXISTING INDEX CONTOUR
		EXISTING INTERMEDIATE CONTOUR
		EXISTING ROAD/TRAIL
		EXISTING PROPERTY LINE
		CONSTRUCTION LIMITS
		EXISTING CHANNEL OR TRIBUTARY CENTERLINE
		EXISTING BUILDING OR BUILT STRUCTURE
		EXISTING CULVERT, SIZE & MTL. AS NOTED
		EXISTING TREE, TO REMAIN (AS SURVEYED)
		CONTROL POINT
		VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
		GRADING
		ACCESS/LAYDOWN AREA
		RIPRAP
		EXISTING RIPRAP
	OE	OVERHEAD ELECTRIC
	SAN	UNDERGROUND SANITARY MAIN
	SS	UNDERGROUND STORM MAIN
		EXISTING CULVERT
	UE	UNDERGROUND ELECTRIC
	GAS	UNDERGROUND GAS
	UT	UNDERGROUND TELEPHONE
	X	EXISTING FENCELINE
		SEDIMENT CONTROL LOG
		BOULDER CROSS VANE
		J-HOOK BOULDER VANE

- NOTES:**
1. CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER CROSS VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-08)
 2. FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED BY ENGINEER.

PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88



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 Corporate Headquarters:
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Name: JESSICA C. L. OLSON License #: 43102
 Date:

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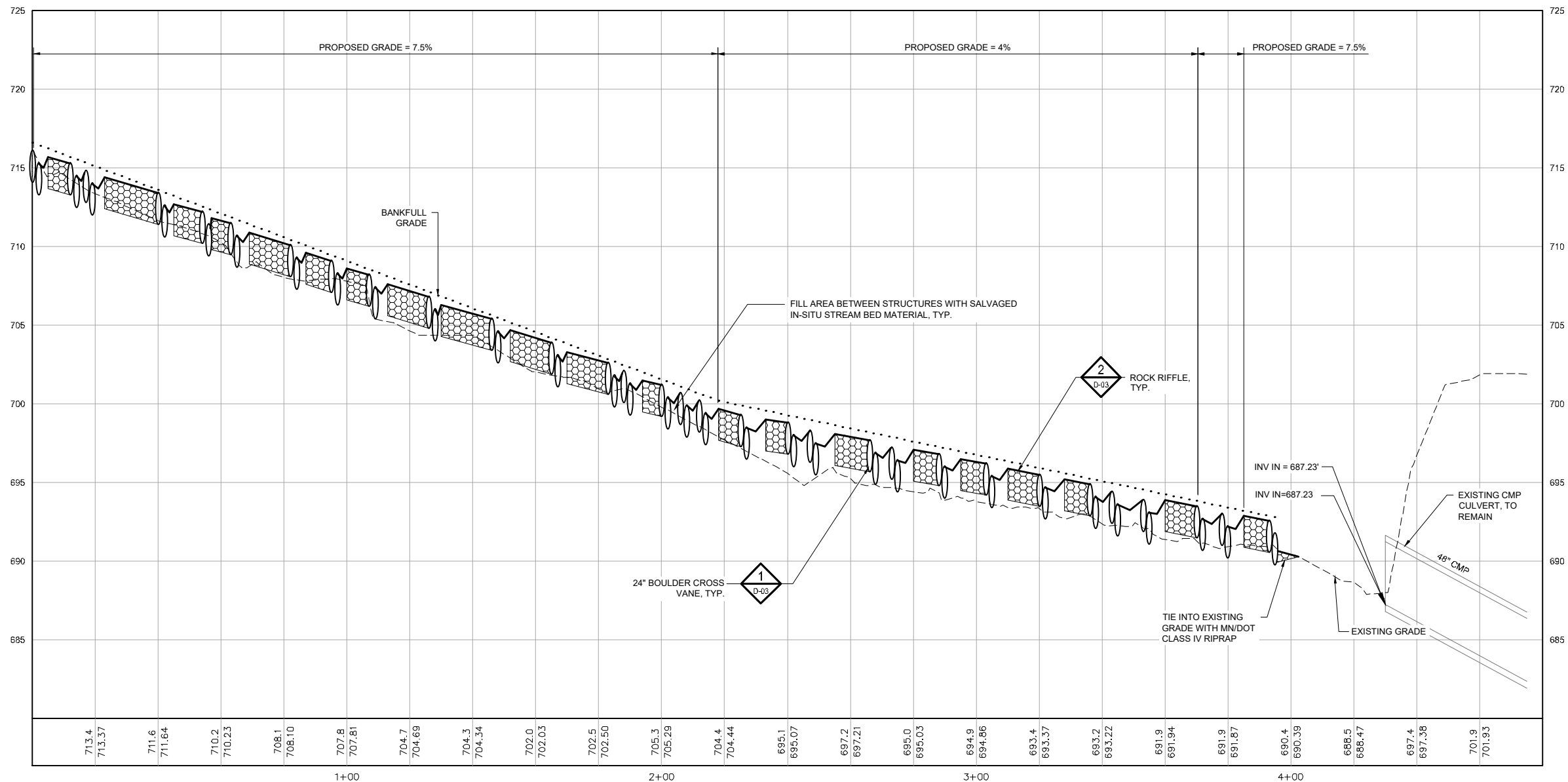
KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 1A PLAN

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: C-06
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 File #: -

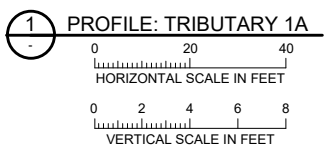


LEGEND

- EXISTING PROFILE
- DESIGN PROFILE
- ... BANKFULL GRADE
- [Hatched Box] EXISTING CULVERT, SIZE & MTL. AS NOTED
- [Rock Pattern Box] ROCK RIFFLE
- [Boulder Symbol] IN-STREAM BOULDER FEATURE, AS NOTED

NOTES:

1. CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-08).



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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 1A PROFILE

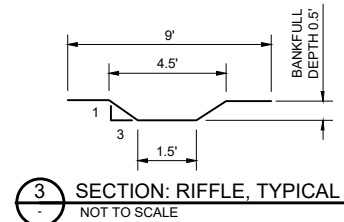
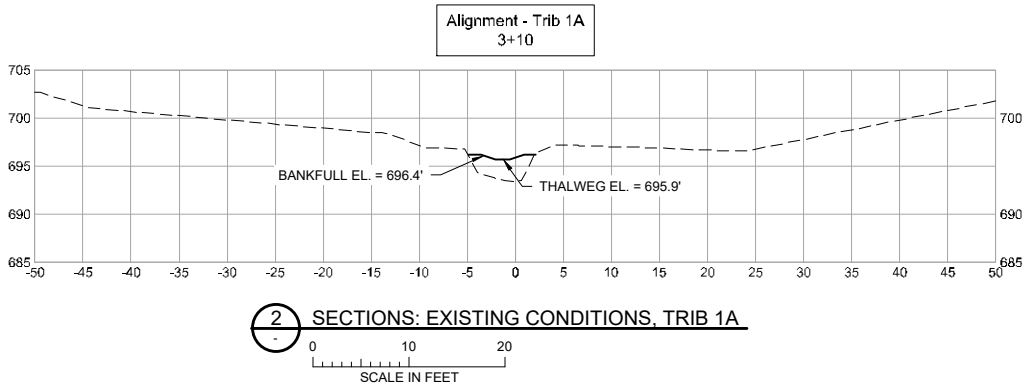
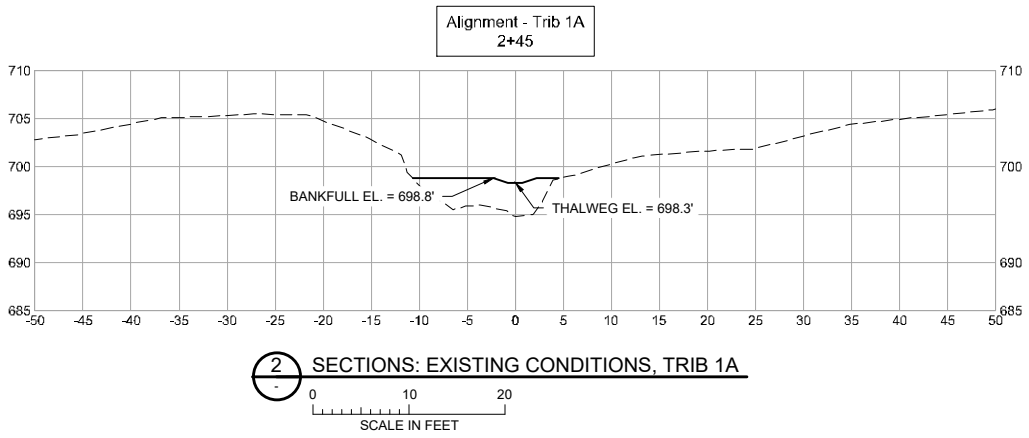
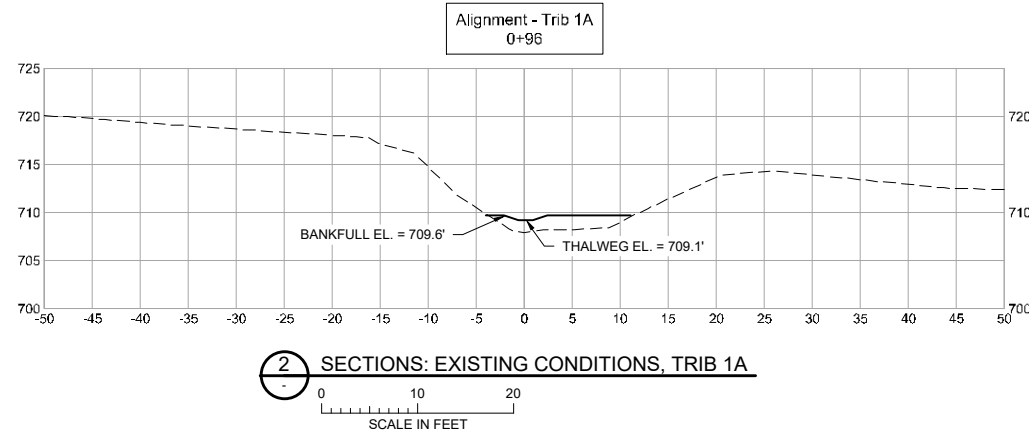
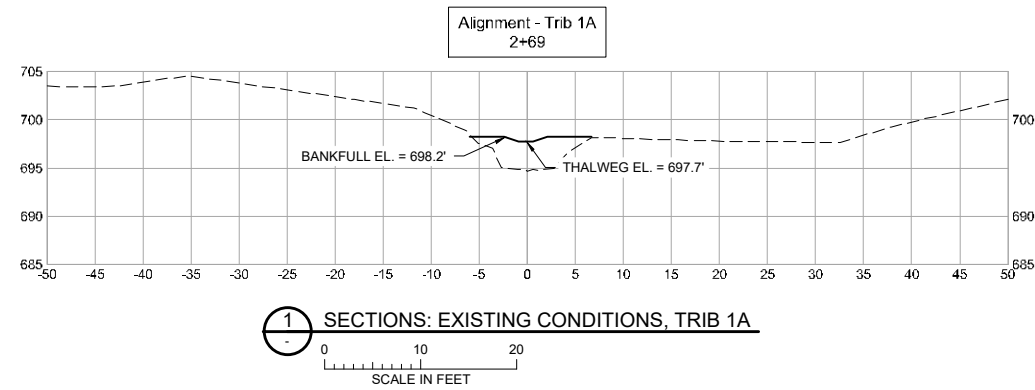
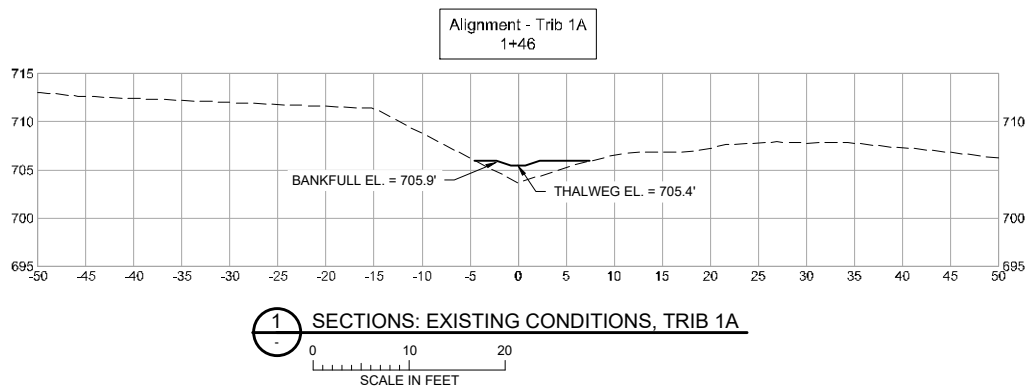
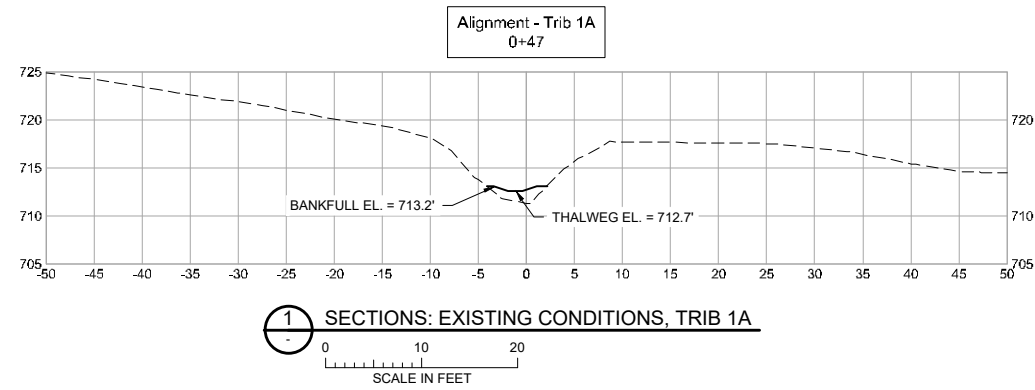
Survey: RRE 12/20 Designed: BARR 01/21
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Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-07**

CC2: -
File #: -

NOTES:

1. ALL CROSS SECTIONS LOOKING IN DOWNSTREAM DIRECTION.



Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
0+00	Cross Vane	716.1	716.6		
0+05	Rock Riffle Start	715.7	716.2	7	
0+12	Cross Vane/Rock Riffle End	715.3	715.8		
0+17	Cross Vane	714.8	715.3		
0+23	Rock Riffle Start	714.4	714.9	17	
0+40	Cross Vane/Rock Riffle End	713.4	713.9		
0+45	Rock Riffle Start	712.7	713.2	9	
0+54	Cross Vane/Rock Riffle End	712.2	712.7		
0+57	Rock Riffle Start	711.8	712.3	6	
0+63	Cross Vane/Rock Riffle End	711.5	712.0		
0+69	Rock Riffle Start	710.9	711.4	13	
0+82	Cross Vane/Rock Riffle End	710.1	710.6		
0+87	Rock Riffle Start	709.6	710.1	8	
0+95	Cross Vane/Rock Riffle End	709.1	709.6		
1+00	Rock Riffle Start	708.6	709.1	7	
1+07	Cross Vane/Rock Riffle End	708.2	708.7		
1+13	Rock Riffle Start	707.6	708.1	13	
o	Cross Vane/Rock Riffle End	706.8	707.3		
1+30	Rock Riffle Start	706.3	706.8	16	
1+46	Cross Vane/Rock Riffle End	705.4	705.9		
1+52	Rock Riffle Start	704.7	705.2	13	
1+65	Cross Vane/Rock Riffle End	703.9	704.4		
1+70	Rock Riffle Start	703.3	703.8	13	
1+83	Cross Vane/Rock Riffle End	702.6	703.1		
1+88	Cross Vane	702.1	702.6		
1+94	Rock Riffle Start	701.5	702.0	6	
2+00	Cross Vane/Rock Riffle End	701.2	701.7		
2+06	Cross Vane	700.7	701.2		
2+12	Cross Vane	700.2	700.7		
2+18	Rock Riffle Start	699.7	700.2	7	
2+25	Cross Vane/Rock Riffle End	699.3	699.8		
2+33	Rock Riffle Start	699.0	699.5	7	
2+40	Cross Vane/Rock Riffle End	698.8	699.3		
2+47	Cross Vane	698.3	698.8		
2+55	Rock Riffle Start	698.1	698.6	11	
2+66	Cross Vane/Rock Riffle End	697.7	698.2		
2+73	Cross Vane	697.2	697.7		
2+80	Rock Riffle Start	697.1	697.6	8	
2+88	Cross Vane/Rock Riffle End	696.8	697.3		
2+95	Rock Riffle Start	696.5	697.0	8	
3+03	Cross Vane/Rock Riffle End	696.2	696.7		
3+10	Rock Riffle Start	695.9	696.4	10	
3+20	Cross Vane/Rock Riffle End	695.5	696.0		
3+28	Rock Riffle Start	695.2	695.7	8	
3+36	Cross Vane/Rock Riffle End	694.9	695.4		
3+43	Cross Vane	694.4	694.9		
3+53	Cross Vane	693.9	694.4		
3+60	Rock Riffle Start	693.9	694.4	10	
3+70	Cross Vane/Rock Riffle End	693.3	693.8		
3+78	Cross Vane	692.7	693.2		
3+85	Rock Riffle Start	692.1	692.6	8	
3+93	Cross Vane/Rock Riffle End	691.5	692.0		

4 TABLE: TRIBUTARY 1A STATIONS
NOT TO SCALE

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Name: JESSICA C. L. OLSON License #: 43102
Date: XX/XX/2021

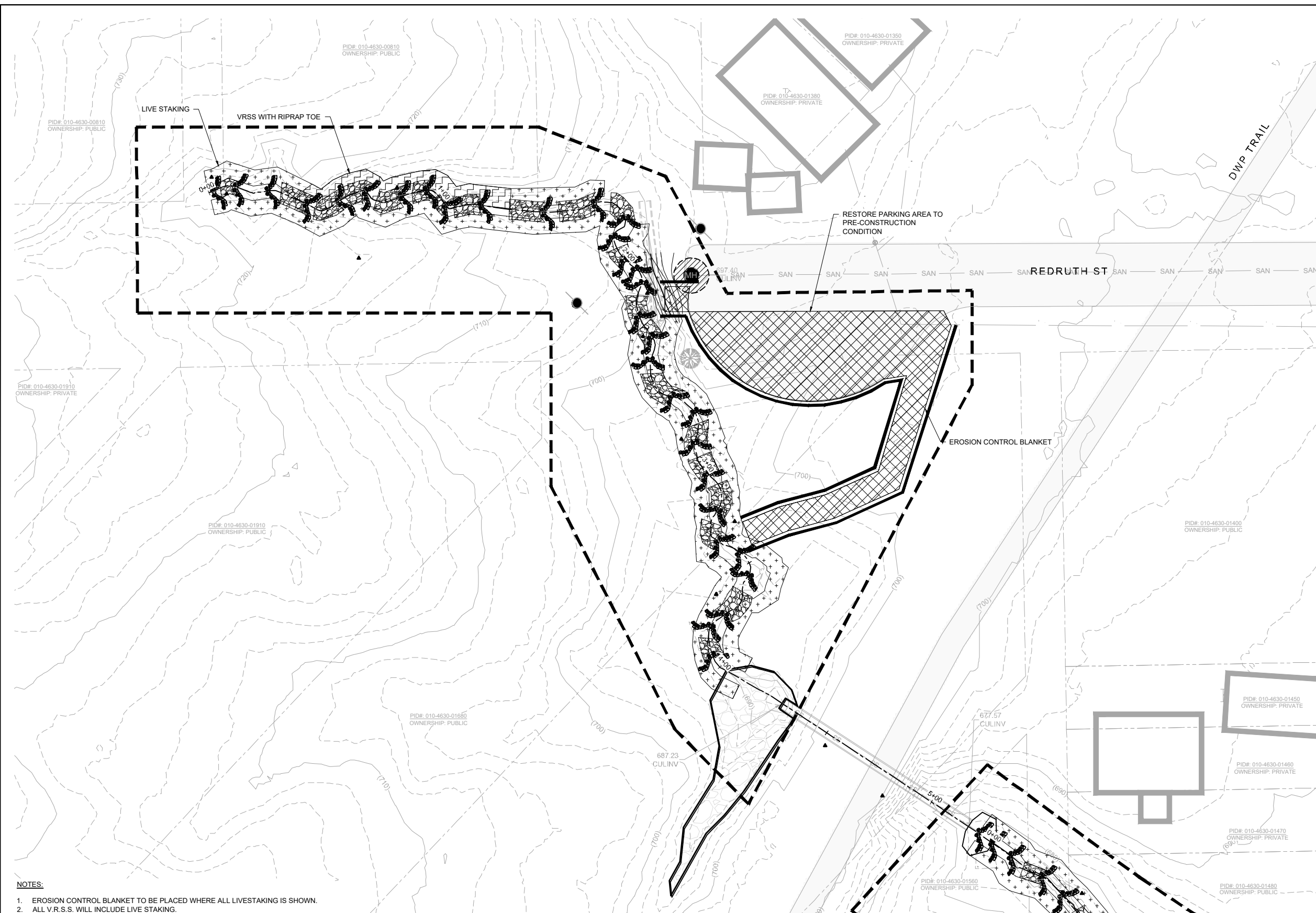
Operations Services
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Materials Equipment
Field Operations
Information Management

KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Date	By

Title: TRIB 1A SECTIONS AND STRUCTURES TABLE
Survey: RRE 12/20 Designed: BARR 01/21
Drawn: RRE 12/20 Drawn: AMW 01/21
Checked: JCO 12/20 Checked: AMW 01/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: C-08
CC2: -
File #: -



LEGEND

	(1040)	EXISTING INDEX CONTOUR
		EXISTING INTERMEDIATE CONTOUR
		EXISTING ROAD/TRAIL
		EXISTING PROPERTY LINE
		CONSTRUCTION LIMITS
		EXISTING CHANNEL OR TRIBUTARY CENTERLINE
		EXISTING BUILDING OR BUILT STRUCTURE
		EXISTING CULVERT, SIZE & MTL. AS NOTED
		EXISTING TREE, TO REMAIN (AS SURVEYED)
		CONTROL POINT
		VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
		RIFFLE
		EROSION CONTROL BLANKET AND SEED
		LIVE STAKE PLANTING
		ACCESS/LAYDOWN AREA
		RIPRAP
		GRADING AREA
		EXISTING RIPRAP
	DT	PROPOSED DRAIN TILE
	OE	OVERHEAD ELECTRIC
	SAN	UNDERGROUND SANITARY MAIN
	SS	UNDERGROUND STORM MAIN
		EXISTING CULVERT
	UE	UNDERGROUND ELECTRIC
	GAS	UNDERGROUND GAS
	UT	UNDERGROUND TELEPHONE
	X	EXISTING FENCELINE
		BOULDER CROSS VANE
		J-HOOK BOULDER VANE

- NOTES:**
1. EROSION CONTROL BLANKET TO BE PLACED WHERE ALL LIVESTAKING IS SHOWN.
 2. ALL V.R.S.S. WILL INCLUDE LIVE STAKING.

1 PLAN: TRIBUTARY 1A REVEGETATION PLAN

0 30 60
SCALE IN FEET

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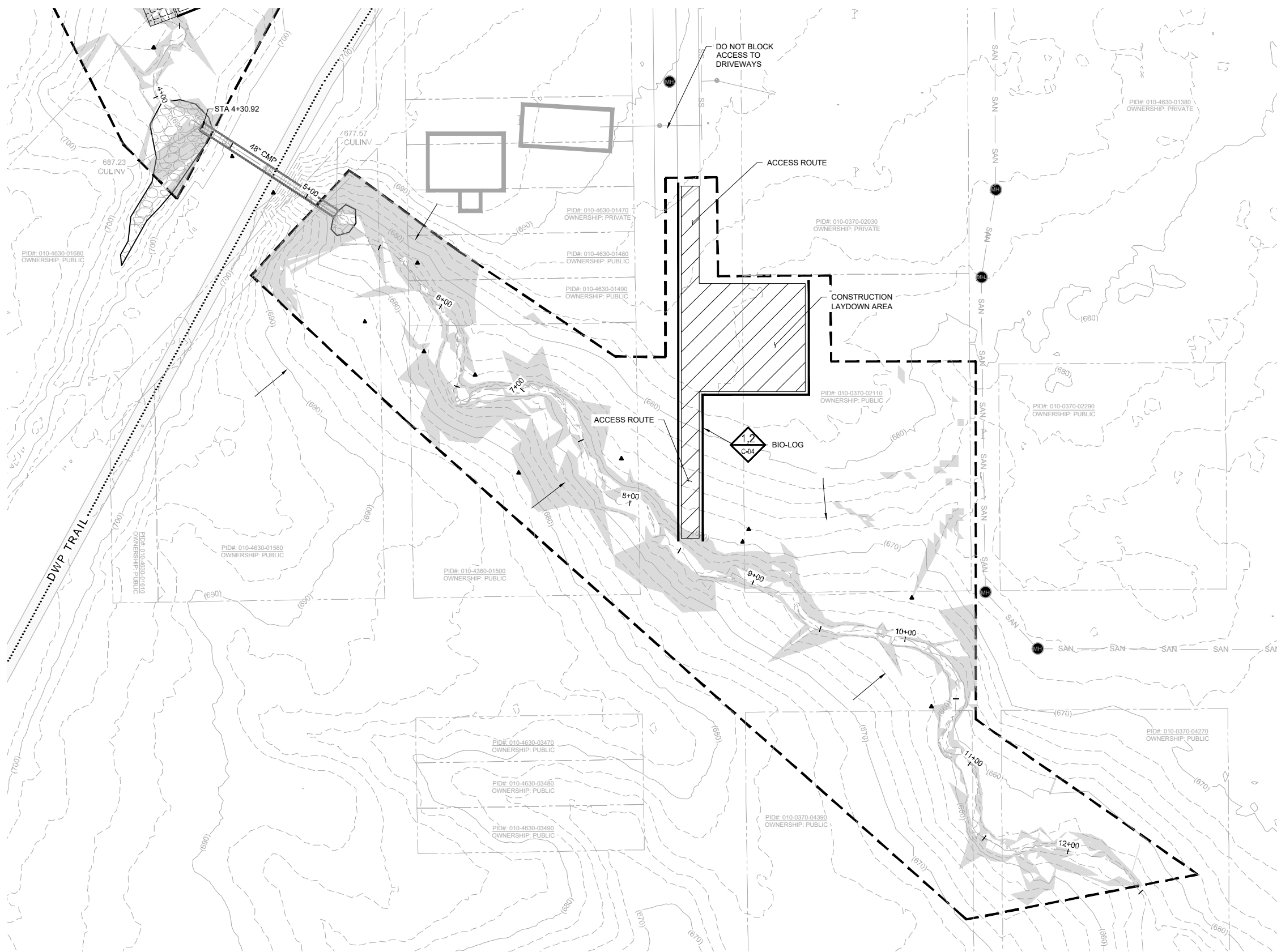
KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 1A REVEGETATION PLAN

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: C-09
CC2: -
File #: -



LEGEND

	(1040)	EXISTING INDEX CONTOUR
		EXISTING INTERMEDIATE CONTOUR
		EXISTING ROAD/TRAIL (IMPERVIOUS SURFACE)
		EXISTING PROPERTY LINE
		CONSTRUCTION LIMITS
		EXISTING CHANNEL OR TRIBUTARY CENTERLINE
		EXISTING BUILDING OR BUILT STRUCTURE
		EXISTING CULVERT, SIZE & MTL. AS NOTED
		EXISTING TREE, TO REMAIN (AS SURVEYED)
		CONTROL POINT
		ACCESS/LAYDOWN AREA
		EXISTING RIPRAP
	OE	OVERHEAD ELECTRIC
	SAN	UNDERGROUND SANITARY MAIN
	SS	UNDERGROUND STORM MAIN
	C	EXISTING CULVERT
	UE	UNDERGROUND ELECTRIC
	GAS	UNDERGROUND GAS
	UT	UNDERGROUND TELEPHONE
	X	EXISTING FENCELINE
		SEDIMENT CONTROL LOG
		SLOPE STEEPER THAN 3H:1V

- NOTES:**
- CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 - ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
 - CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
 - CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
 - TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
 - TREES IDENTIFIED BY ENGINEER FOR PRESERVATION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MNDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
 - CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
 - EXISTING PROPERTY BOUNDARY LINES FROM PARCEL BOUNDARY SURVEY BY NORTHWESTERN SURVEYING AND ENGINEERING, APRIL 16, 2021, AND SUPPLEMENTED BY PROPERTY PARCEL LINE DATA FROM ST. LOUIS COUNTY, PROVIDED TO BARR AS RE-PROJECTED GIS SHAPEFILE, DECEMBER 29, 2020
 - KINGSBURY CREEK AND TRIBUTARIES TO KINGSBURY CREEK ARE LISTED AS SPECIAL WATERS. REFER TO SECTION 4.0 OF THE SWPPP FOR ADDITIONAL DETAILS.
 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

1 PLAN: TRIBUTARY 1B SITE ACCESS, EROSION CONTROL AND REMOVALS

0 30 60
SCALE IN FEET

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Date: _____

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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

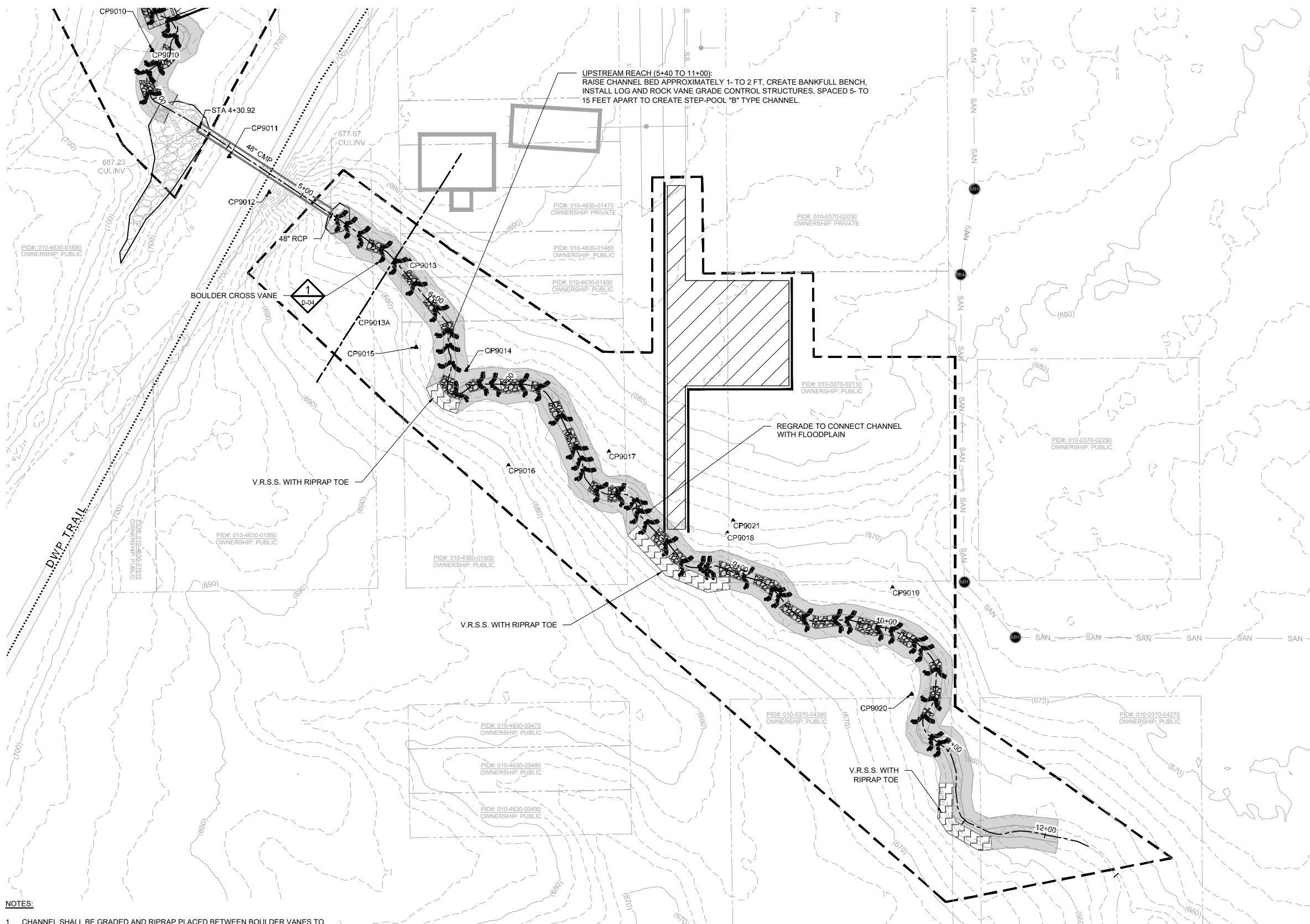
Revisions	
Date	By

Title: TRIBUTARY 1B SITE ACCESS, EROSION CONTROL AND REMOVALS

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
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Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-10**

CC2: -
File #: -



LEGEND

- (1040) EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING ROAD/TRAIL
- EXISTING PROPERTY LINE
- CONSTRUCTION LIMITS
- EXISTING CHANNEL OR TRIBUTARY CENTERLINE
- EXISTING BUILDING OR BUILT STRUCTURE
- EXISTING CULVERT, SIZE & MTL. AS NOTED
- EXISTING TREE, TO REMAIN (AS SURVEYED)
- CONTROL POINT
- VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
- GRADING
- ACCESS/LAYDOWN AREA
- RIPRAP
- EXISTING RIPRAP
- OVERHEAD ELECTRIC
- UNDERGROUND SANITARY MAIN
- UNDERGROUND STORM MAIN
- EXISTING CULVERT
- UNDERGROUND ELECTRIC
- UNDERGROUND GAS
- UNDERGROUND TELEPHONE
- EXISTING FENCELINE
- SEDIMENT CONTROL LOG
- BOULDER CROSS VANE
- J-HOOK BOULDER VANE

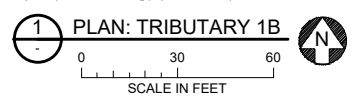
CONTROL POINTS

POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9012	CP9012	701.63	413111.37	2852507.76
9013	CP9013	676.87	413072.65	2852587.14
9014	CP9014	673.86	413010.78	2852619.07
9015	CP9015	676.32	413023.84	2852590.78
9016	CP9016	680.97	412956.78	2852642.89
9017	CP9017	673.25	412964.71	2852699.62
9018	CP9018	670.20	412918.87	2852766.42
9019	CP9019	666.37	412887.81	2852859.82
9020	CP9020	662.03	412827.93	2852870.61
9021	CP9021	671.68	412925.68	2852769.86
90133	CP9013A	682.49	413040.30	2852558.22

NOTES:

- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-13)
- FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED BY ENGINEER

PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88



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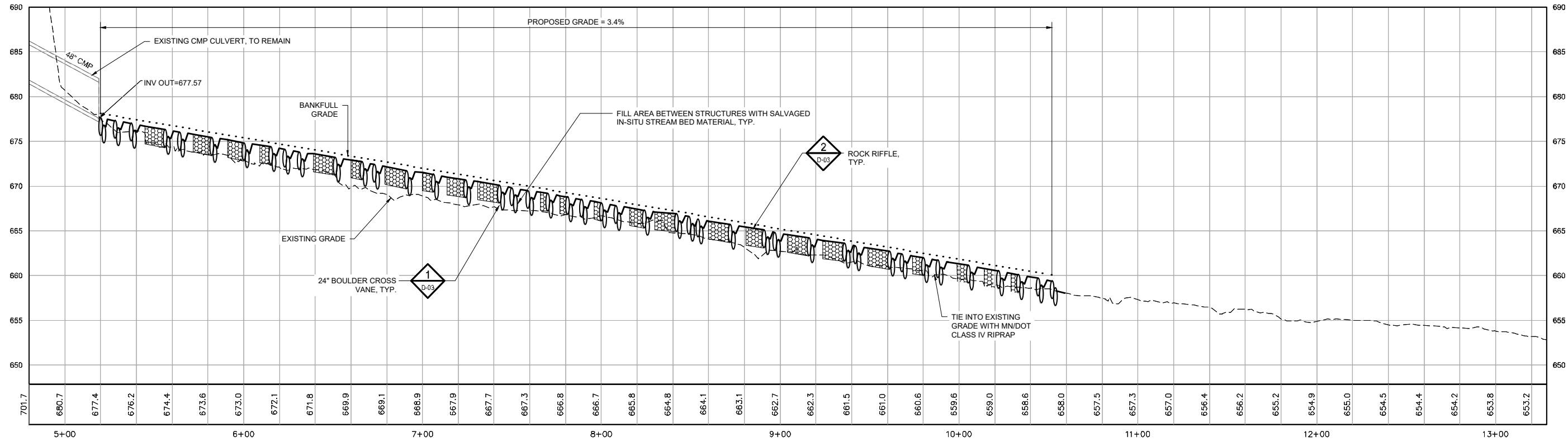
KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

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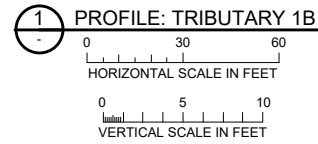
Title: TRIBUTARY 1B PLAN
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: C-11
 CC2: -
 File #: -



NOTES:

1. CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-13).



LEGEND

- EXISTING PROFILE
- DESIGN PROFILE
- BANKFULL GRADE
- EXISTING CULVERT, SIZE & MTL. AS NOTED
- ROCK RIFFLE
- IN-STREAM BOULDER FEATURE, AS NOTED

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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 1B PROFILE

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Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

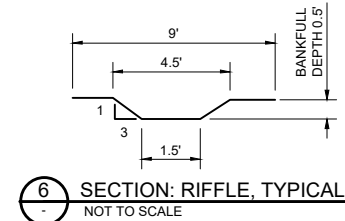
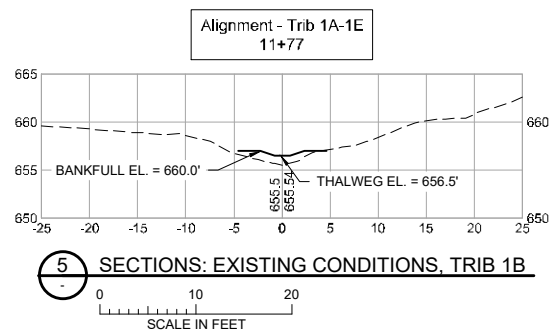
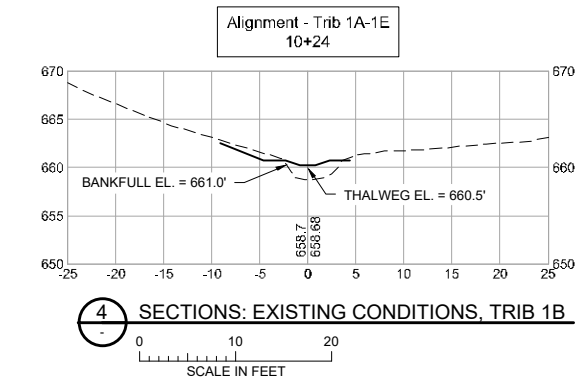
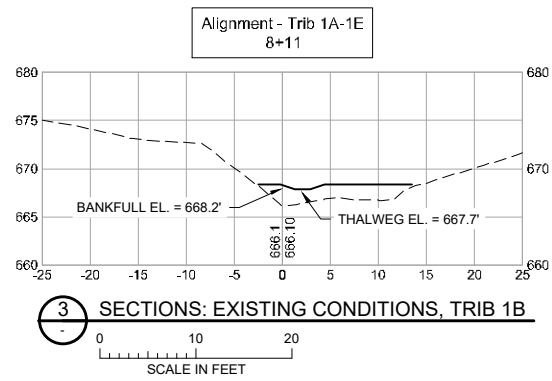
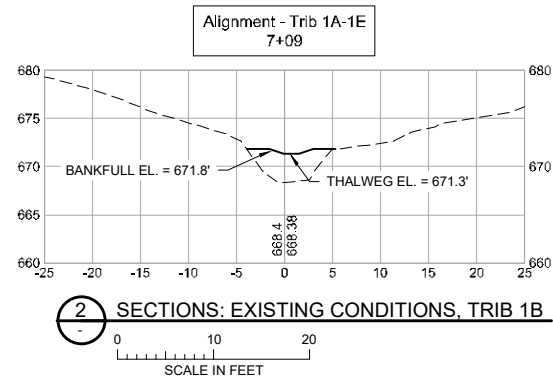
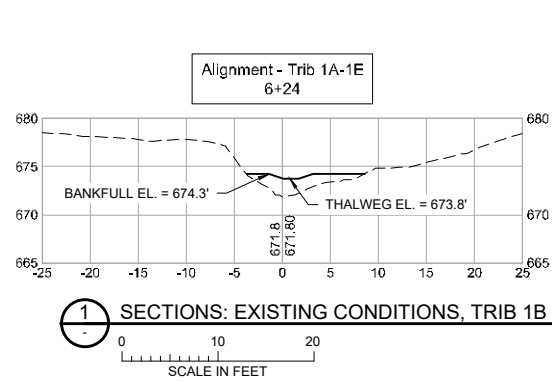
Sheet: **C-12**

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File #: -

NOTES:

1. ALL CROSS SECTIONS LOOKING IN DOWNSTREAM DIRECTION.



Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
5+20	Cross Vane	677.6	678.1		
5+28	Cross Vane	677.3	677.6		
5+37	Cross Vane	677.0	677.1		
5+45	Rock Riffle Start	676.7	677.2	11	
5+56	Cross Vane/Rock Riffle End	676.3	676.6		
5+64	Cross Vane	676.0	676.1		
5+72	Rock Riffle Start	675.8	676.3	10	
5+82	Cross Vane/Rock Riffle End	675.4	675.7		
5+91	Rock Riffle Start	675.2	675.7	9	
6+00	Cross Vane/Rock Riffle End	674.8	675.1		
6+09	Rock Riffle Start	674.6	675.1	6	
6+15	Cross Vane/Rock Riffle End	674.4	674.7		
6+23	Cross Vane	674.1	674.2		
6+31	Cross Vane	673.8	673.7		
6+39	Rock Riffle Start	673.6	674.1	12	
6+51	Cross Vane/Rock Riffle End	673.2	673.3		
6+60	Rock Riffle Start	672.9	673.4	6	
6+66	Cross Vane/Rock Riffle End	672.7	673.0		
6+73	Cross Vane	672.4	672.5		
6+79	Rock Riffle Start	672.2	672.7	12	
6+91	Cross Vane/Rock Riffle End	671.7	672.0		
7+00	Rock Riffle Start	671.5	672.0	6	
7+06	Cross Vane/Rock Riffle End	671.3	671.6		
7+14	Rock Riffle Start	671.0	671.5	10	
7+24	Cross Vane/Rock Riffle End	670.7	670.9		
7+31	Rock Riffle Start	670.5	671.0	12	
7+43	Cross Vane/Rock Riffle End	670.1	670.2		
7+50	Cross Vane	669.8	669.7		
7+59	Cross Vane	669.5	669.2		
7+66	Rock Riffle Start	669.3	669.8	4	
7+70	Cross Vane/Rock Riffle End	669.2	669.6		
7+77	Rock Riffle Start	668.9	669.4	4	
7+81	Cross Vane/Rock Riffle End	668.8	669.2		
7+89	Cross Vane	668.5	668.7		
7+96	Rock Riffle Start	668.3	668.8	4	
8+00	Cross Vane/Rock Riffle End	668.1	668.6		
8+08	Cross Vane	667.8	668.1		
8+16	Rock Riffle Start	667.6	668.1	8	
8+24	Cross Vane/Rock Riffle End	667.3	667.8		
8+30	Rock Riffle Start	667.1	667.6	12	
8+42	Cross Vane/Rock Riffle End	666.9	667.1		
8+49	Cross Vane	666.6	666.6		
8+54	Cross Vane	666.3	666.1		
8+60	Rock Riffle Start	666.1	666.6	12	

Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
8+72	Cross Vane/Rock Riffle End	665.7	666.1		
8+81	Rock Riffle Start	665.4	665.9	10	
8+91	Cross Vane/Rock Riffle End	665.1	665.5		
8+97	Cross Vane	664.8	665.0		
9+04	Rock Riffle Start	664.6	665.1	12	
9+16	Cross Vane/Rock Riffle End	664.2	664.6		
9+24	Rock Riffle Start	663.9	664.4	12	
9+36	Cross Vane/Rock Riffle End	663.6	663.9		
9+42	Cross Vane	663.3	663.4		
9+49	Rock Riffle Start	663.1	663.6	12	
9+61	Cross Vane/Rock Riffle End	662.7	663.1		
9+68	Cross Vane	662.4	662.6		
9+74	Rock Riffle Start	662.2	662.7	6	
9+80	Cross Vane/Rock Riffle End	662.0	662.5		
9+88	Cross Vane	661.3	661.8		
9+99	Rock Riffle Start	661.0	661.5	6	
10+05	Cross Vane/Rock Riffle End	660.8	661.3		
10+14	Rock Riffle Start	660.4	660.9	8	
10+22	Cross Vane/Rock Riffle End	660.1	660.6		
10+29	Rock Riffle Start	659.8	660.3	4	
10+33	Cross Vane/Rock Riffle End	659.6	660.1		
10+44	Cross Vane	659.1	659.6		
10+52	Cross Vane	658.6	659.1		

7 TABLE: TRIBUTARY 1B STATIONS
NOT TO SCALE

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Name: **JESSICA C. L. OLSON** License #: 43102
Date: XX/XX/2021

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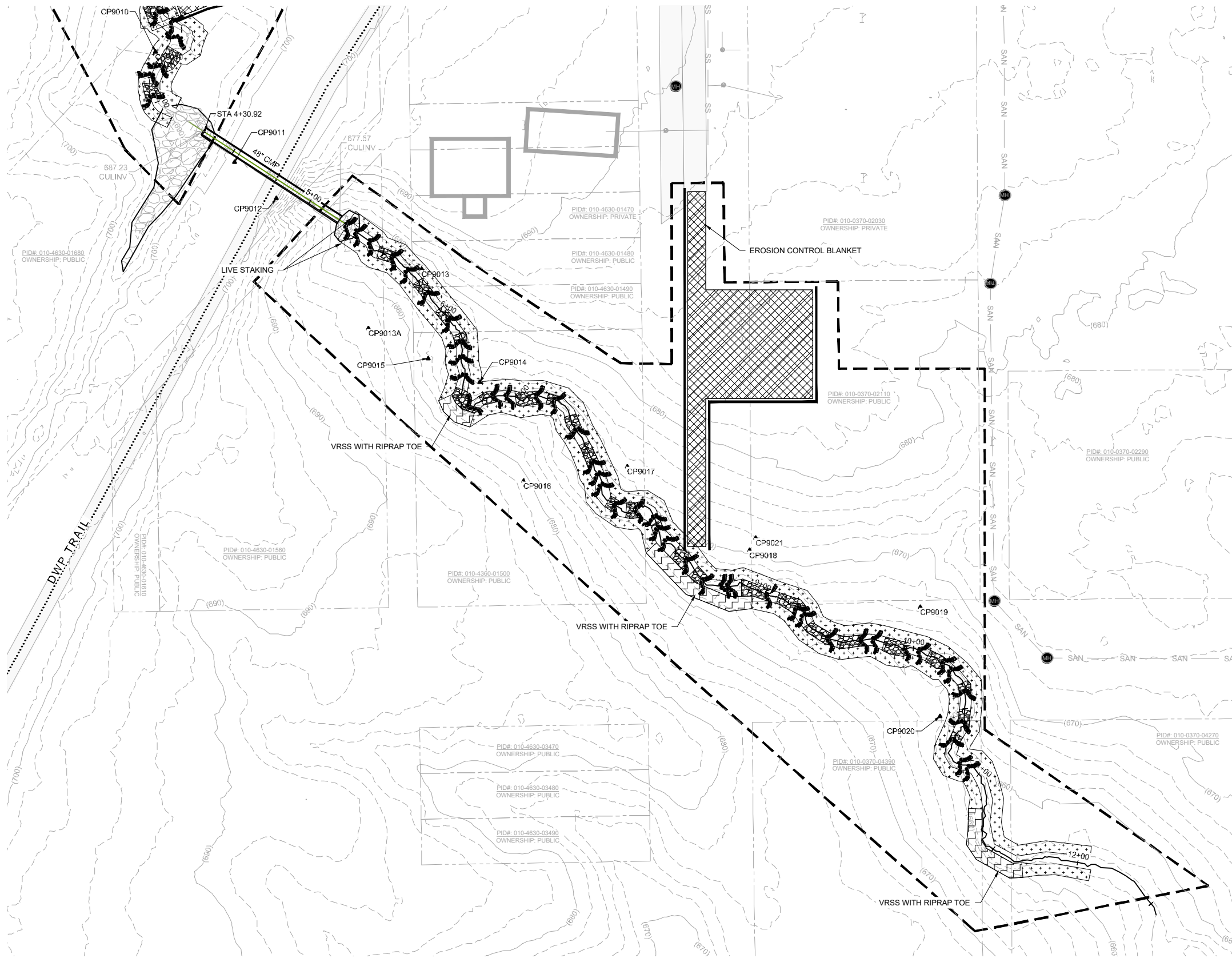
KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIB 1B SECTIONS AND STRUCTURES TABLE
Survey: RRE 12/20
Drawn: RRE 12/20
Checked: JCO 12/20
Horz. datum: St. Louis Co. Coord.

Designed: BARR 01/21
Drawn: AMW 01/21
Checked: AMW 01/21
Vert. datum: NAVD88

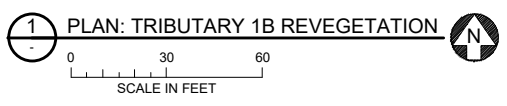
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CC2: -
File #: -



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
	RIFFLE
	EROSION CONTROL BLANKET AND SEED
	LIVE STAKE PLANTING
	ACCESS/LAYDOWN AREA
	RIPRAP
	GRADING AREA
	EXISTING RIPRAP
	PROPOSED DRAIN TILE
	OVERHEAD ELECTRIC
	UNDERGROUND SANITARY MAIN
	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	BOULDER CROSS VANE
	J-HOOK BOULDER VANE

- NOTES:**
- EROSION CONTROL BLANKET TO BE PLACED WHERE ALL LIVE STAKING IS SHOWN.
 - ALL V.R.S.S. WILL INCLUDE LIVE STAKING.



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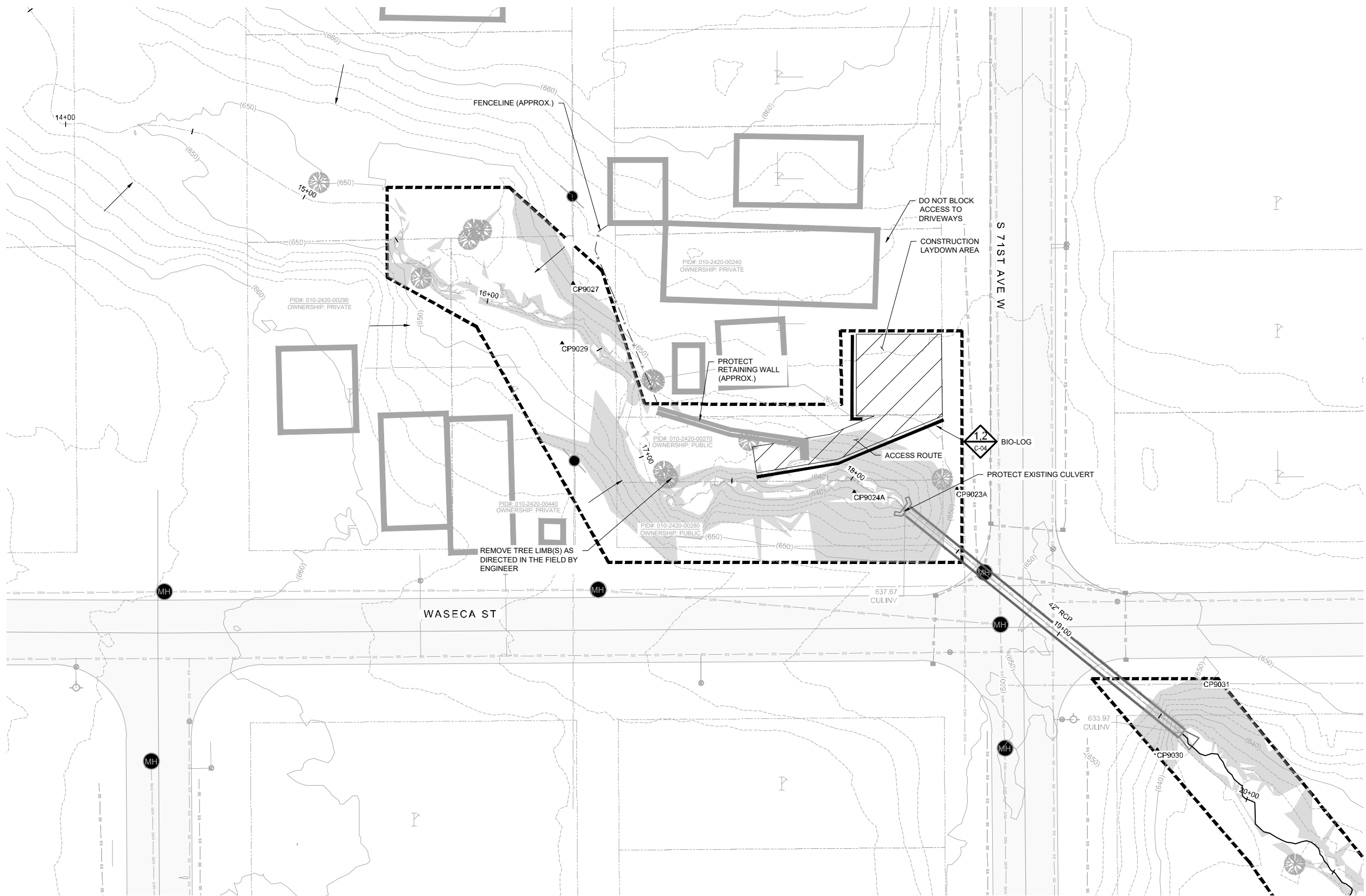
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Information Management

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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **TRIBUTARY 1B REVEGETATION PLAN**
Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-14**
CC2: -
File #: -



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL (IMPERVIOUS SURFACE)
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	ACCESS/LAYDOWN AREA
	EXISTING RIPRAP
	OVERHEAD ELECTRIC
	UNDERGROUND SANITARY MAIN
	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	SEDIMENT CONTROL LOG
	SLOPE STEEPER THAN 3H:1V

- NOTES:**
- CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 - EXISTING PROPERTY BOUNDARY LINES FROM PARCEL BOUNDARY SURVEY BY NORTHWESTERN SURVEYING AND ENGINEERING, APRIL 16, 2021, AND SUPPLEMENTED BY PROPERTY PARCEL LINE DATA FROM ST. LOUIS COUNTY, PROVIDED TO BARR AS RE-PROJECTED GIS SHAPEFILE, DECEMBER 29, 2020.
 - ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
 - CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
 - CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
 - TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
 - TREES IDENTIFIED BY ENGINEER FOR PRESERVATION SHALL BE PROTECTED AGAINST ROOT COMPACTION. DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MNDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
 - CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
 - KINGSBURY CREEK AND TRIBUTARIES TO KINGSBURY CREEK ARE LISTED AS SPECIAL WATERS. REFER TO SECTION 4.0 OF THE SWPPP FOR ADDITIONAL DETAILS.
 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

1 PLAN: TRIBUTARY 1C SITE ACCESS, EROSION CONTROL AND REMOVALS

0 20 40
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Date: -

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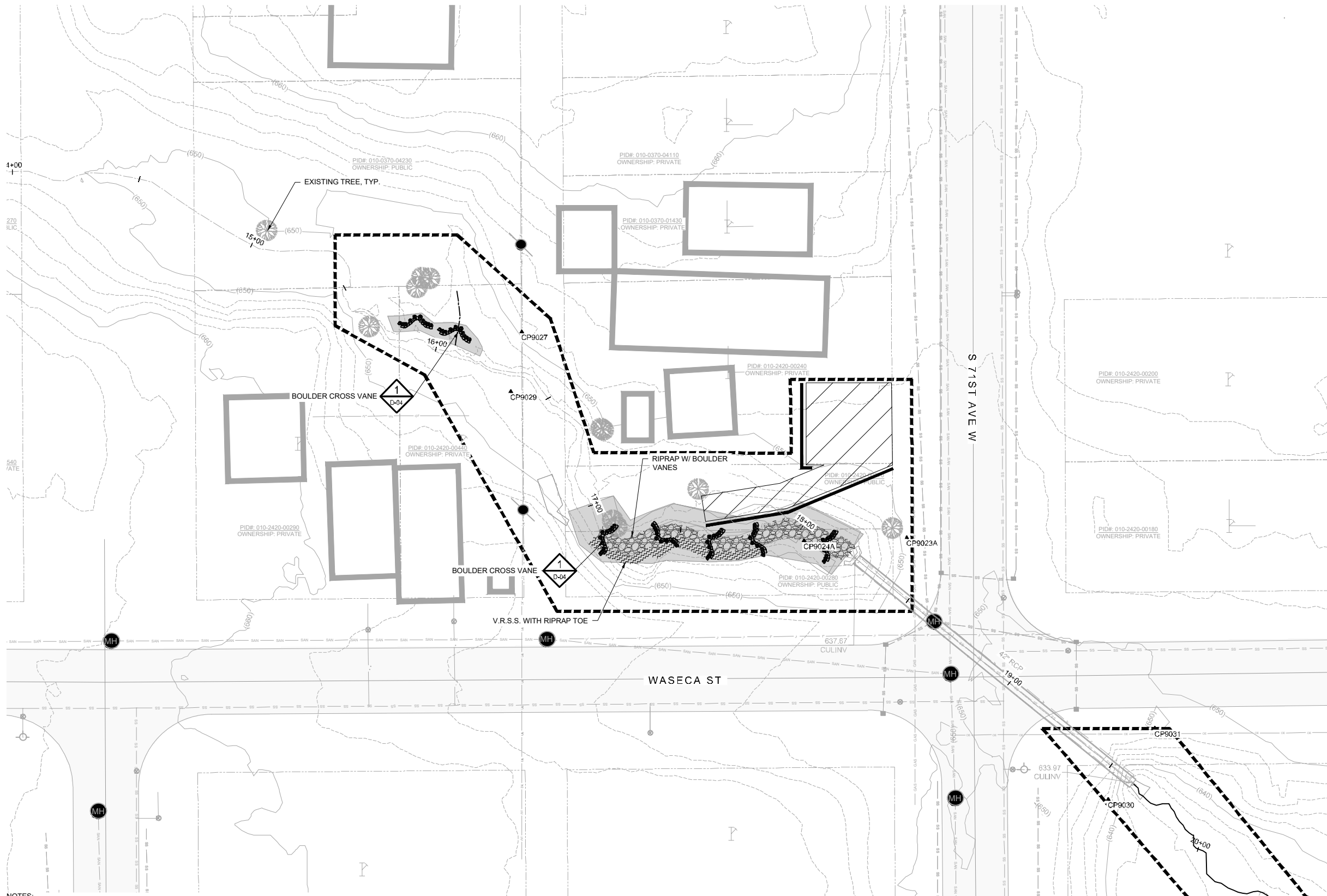
KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 1C SITE ACCESS, EROSION CONTROL AND REMOVALS

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

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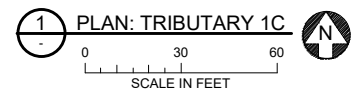


LEGEND

- (1040) EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING ROAD/TRAIL
- EXISTING PROPERTY LINE
- CONSTRUCTION LIMITS
- EXISTING CHANNEL OR TRIBUTARY CENTERLINE
- EXISTING BUILDING OR BUILT STRUCTURE
- EXISTING CULVERT, SIZE & MTL. AS NOTED
- EXISTING TREE, TO REMAIN (AS SURVEYED)
- CONTROL POINT
- VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
- GRADING
- ACCESS/LAYDOWN AREA
- RIPRAP
- EXISTING RIPRAP
- OVERHEAD ELECTRIC
- UNDERGROUND SANITARY MAIN
- UNDERGROUND STORM MAIN
- EXISTING CULVERT
- UNDERGROUND ELECTRIC
- UNDERGROUND GAS
- UNDERGROUND TELEPHONE
- EXISTING FENCELINE
- SEDIMENT CONTROL LOG
- BOULDER CROSS VANE
- J-HOOK BOULDER VANE

CONTROL POINTS				
POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9027	CP9027	650.63	412561.32	2853226.86
9029	CP9029	647.20	412508.47	2853222.66
90233	CP9023A	650.82	412452.69	2853373.91
90243	CP9024A	640.15	412451.45	2853334.65

- NOTES:**
- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-18)
 - FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED BY ENGINEER



PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88

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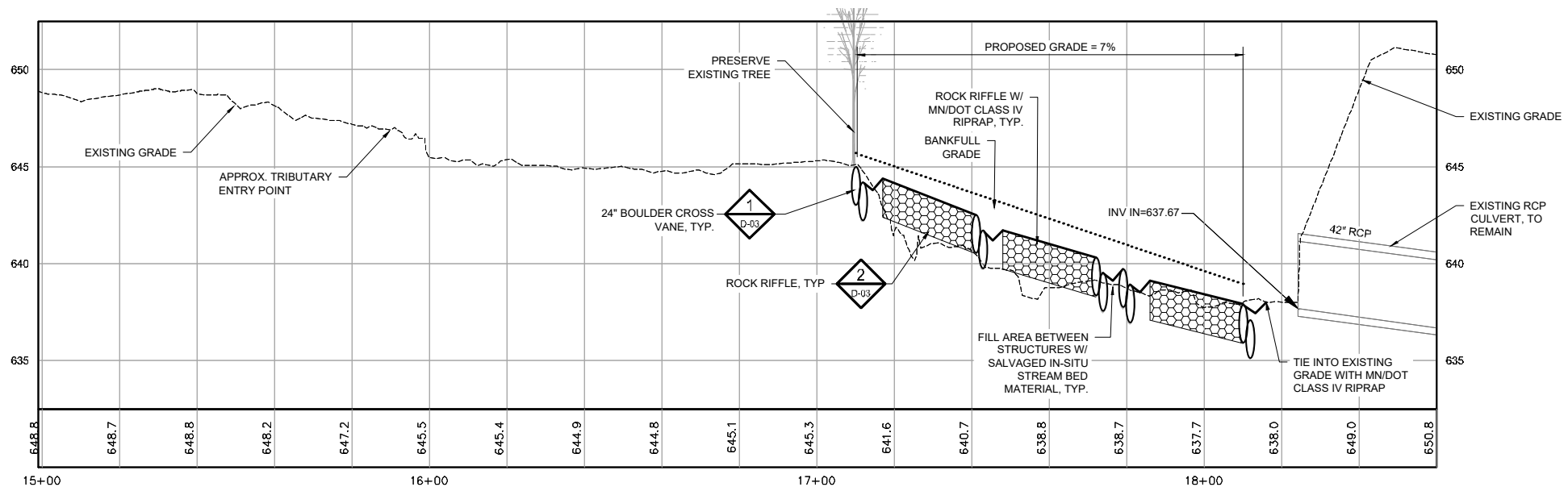
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KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 1C PLAN
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

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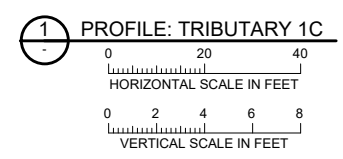
LEGEND

- EXISTING PROFILE
- DESIGN PROFILE
- BANKFULL GRADE
- ▭ EXISTING CULVERT, SIZE & MTL. AS NOTED
- ▨ ROCK RIFFLE
- IN-STREAM BOULDER FEATURE, AS NOTED

Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
17+10	Cross Vane	645.0	645.7		
17+17	Rock Riffle Start	644.4	645.1	24	
17+41	Cross Vane/Rock Riffle End	642.5	643.2		
17+48	Rock Riffle Start	641.7	642.4	24	
17+72	Cross Vane/Rock Riffle End	640.3	641.0		
17+79	Cross Vane	639.7	640.4		
17+86	Rock Riffle Start	639.1	639.8	24	
18+10	Cross Vane/Rock Riffle End	637.9	638.6		

NOTES:

- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (C-17).



2 TABLE: TRIBUTARY 1C STATIONS
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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

Date	By

Title: **TRIBUTARY 1C PROFILE**

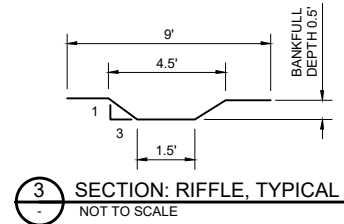
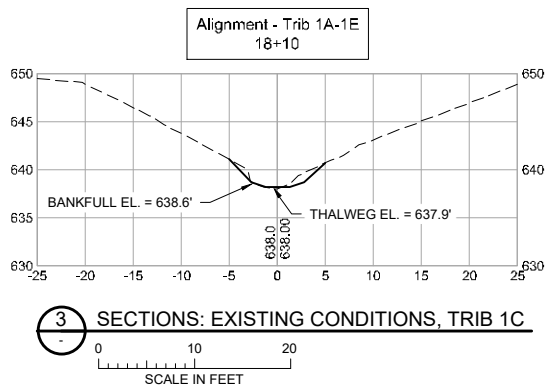
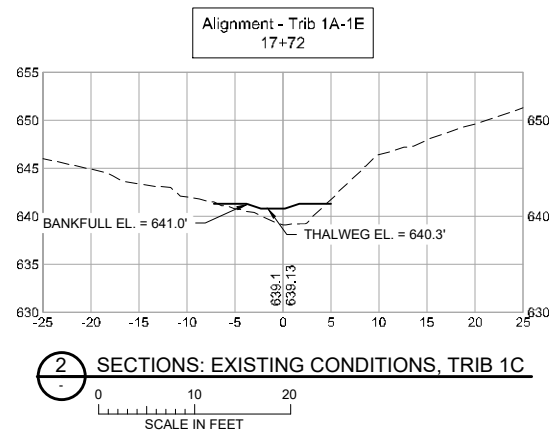
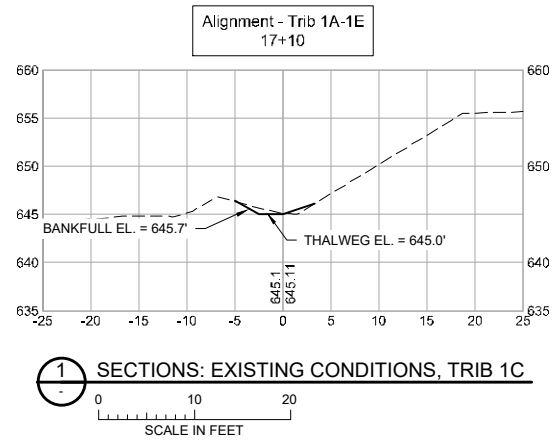
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 Checked: JCO 12/20 Checked: JCO 02/21
 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-17**

CC2: -
File #: -

NOTES:

1. ALL CROSS SECTIONS LOOKING IN DOWNSTREAM DIRECTION.



Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
17+10	Cross Vane	645.0	645.7		
17+17	Rock Riffle Start	644.4	645.1	24	
17+41	Cross Vane/Rock Riffle End	642.5	643.2		
17+48	Rock Riffle Start	641.7	642.4	24	
17+72	Cross Vane/Rock Riffle End	640.3	641.0		
17+79	Cross Vane	639.7	640.4		
17+86	Rock Riffle Start	639.1	639.8	24	
18+10	Cross Vane/Rock Riffle End	637.9	638.6		

4 TABLE: TRIBUTARY 1C STATIONS NOT TO SCALE

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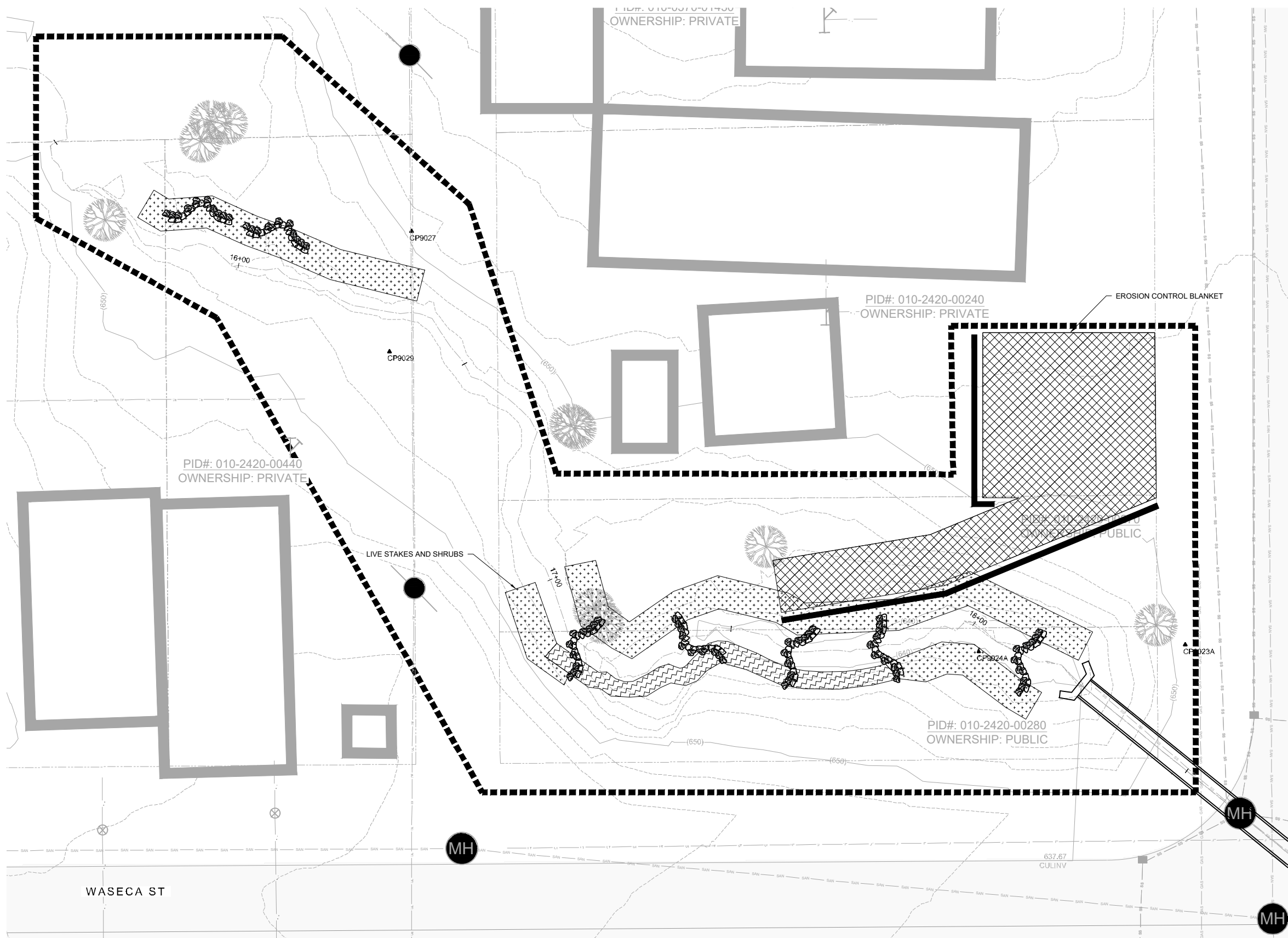
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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIB 1C SECTIONS AND STRUCTURES TABLE

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: RRE 12/20	Drawn: AMW 01/21
Checked: JCO 12/20	Checked: AMW 01/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: **C-18**
CC2: -
File #: -



LEGEND

	(1040) EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
	RIFFLE
	EROSION CONTROL BLANKET AND SEED
	LIVE STAKE PLANTING
	ACCESS/LAYDOWN AREA
	RIPRAP
	GRADING AREA
	EXISTING RIPRAP
	PROPOSED DRAIN TILE
	OVERHEAD ELECTRIC
	UNDERGROUND SANITARY MAIN
	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	BOULDER CROSS VANE
	J-HOOK BOULDER VANE

- NOTES:**
1. EROSION CONTROL BLANKET TO BE PLACED WHERE ALL LIVE STAKING IS SHOWN.
 2. ALL V.R.S.S. WILL INCLUDE LIVE STAKING.

1 PLAN: TRIBUTARY 1C REVEGETATION

SCALE IN FEET

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Project Office:
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Ph: (218) 529-8200
Fax: (218) 529-8202
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Name: JESSICA C. L. OLSON License #: 43102

Date: -

Operations Services
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Materials
Equipment
Field Operations
Information Management

KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

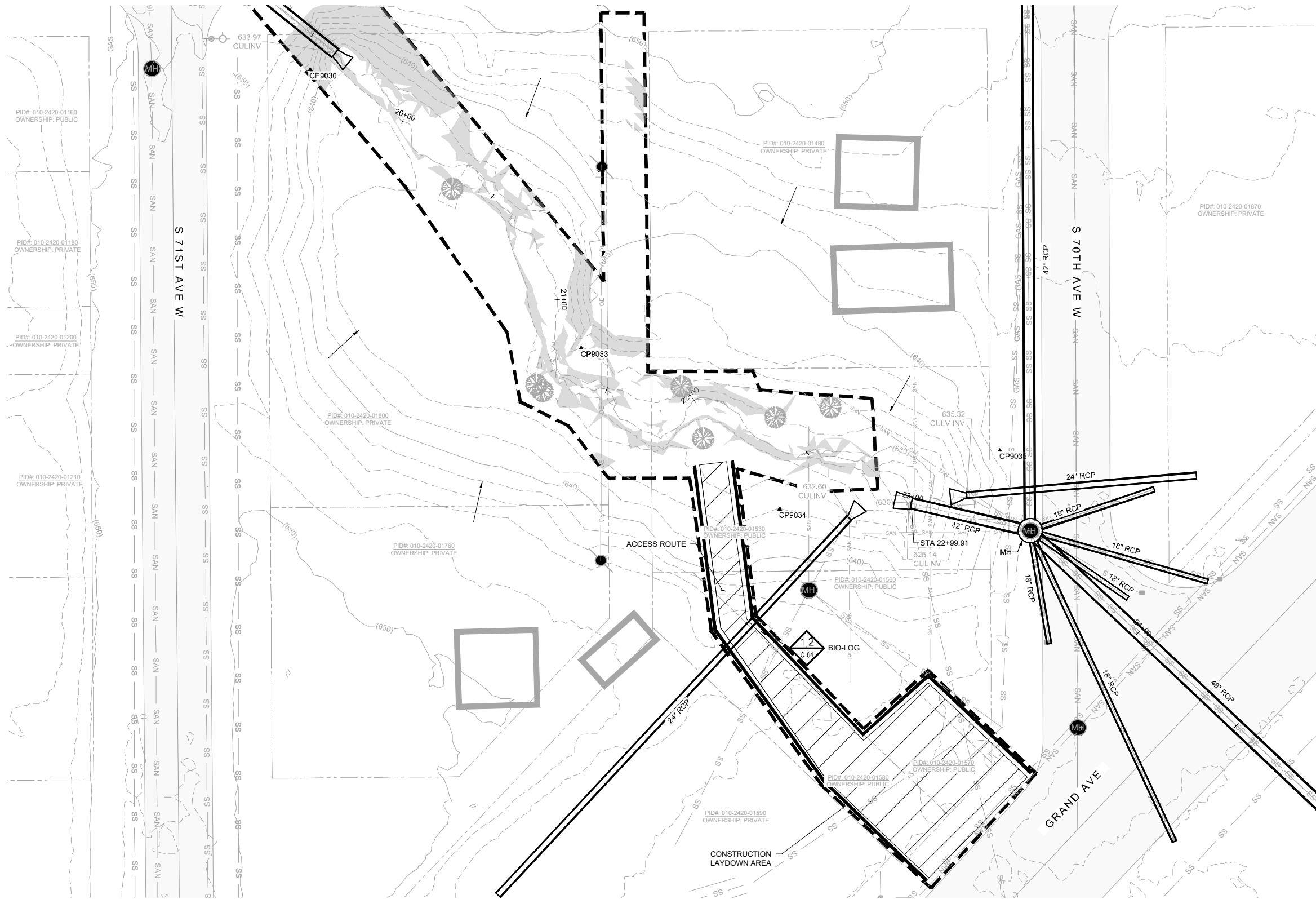
Title: TRIBUTARY 1C REVEGETATION PLAN

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: C-19

CC2: -

File #: -



LEGEND

	(1040) EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL (IMPERVIOUS SURFACE)
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	ACCESS/LAYDOWN AREA
	EXISTING RIPRAP
	OE OVERHEAD ELECTRIC
	SAN UNDERGROUND SANITARY MAIN
	SS UNDERGROUND STORM MAIN
	UE UNDERGROUND ELECTRIC
	GAS UNDERGROUND GAS
	UT UNDERGROUND TELEPHONE
	X EXISTING FENCELINE
	SEDIMENT CONTROL LOG
	SLOPE STEEPER THAN 3H:1V

- NOTES:**
- CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 - ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
 - CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
 - CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
 - TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
 - TREES IDENTIFIED BY ENGINEER FOR PRESERVATION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MNDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
 - CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
 - KINGSBURY CREEK AND TRIBUTARIES TO KINGSBURY CREEK ARE LISTED AS SPECIAL WATERS. REFER TO SECTION 4.0 OF THE SWPPP FOR ADDITIONAL DETAILS.
 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

1 PLAN: TRIBUTARY 1D SITE ACCESS, EROSION CONTROL AND REMOVALS

0 20 40
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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

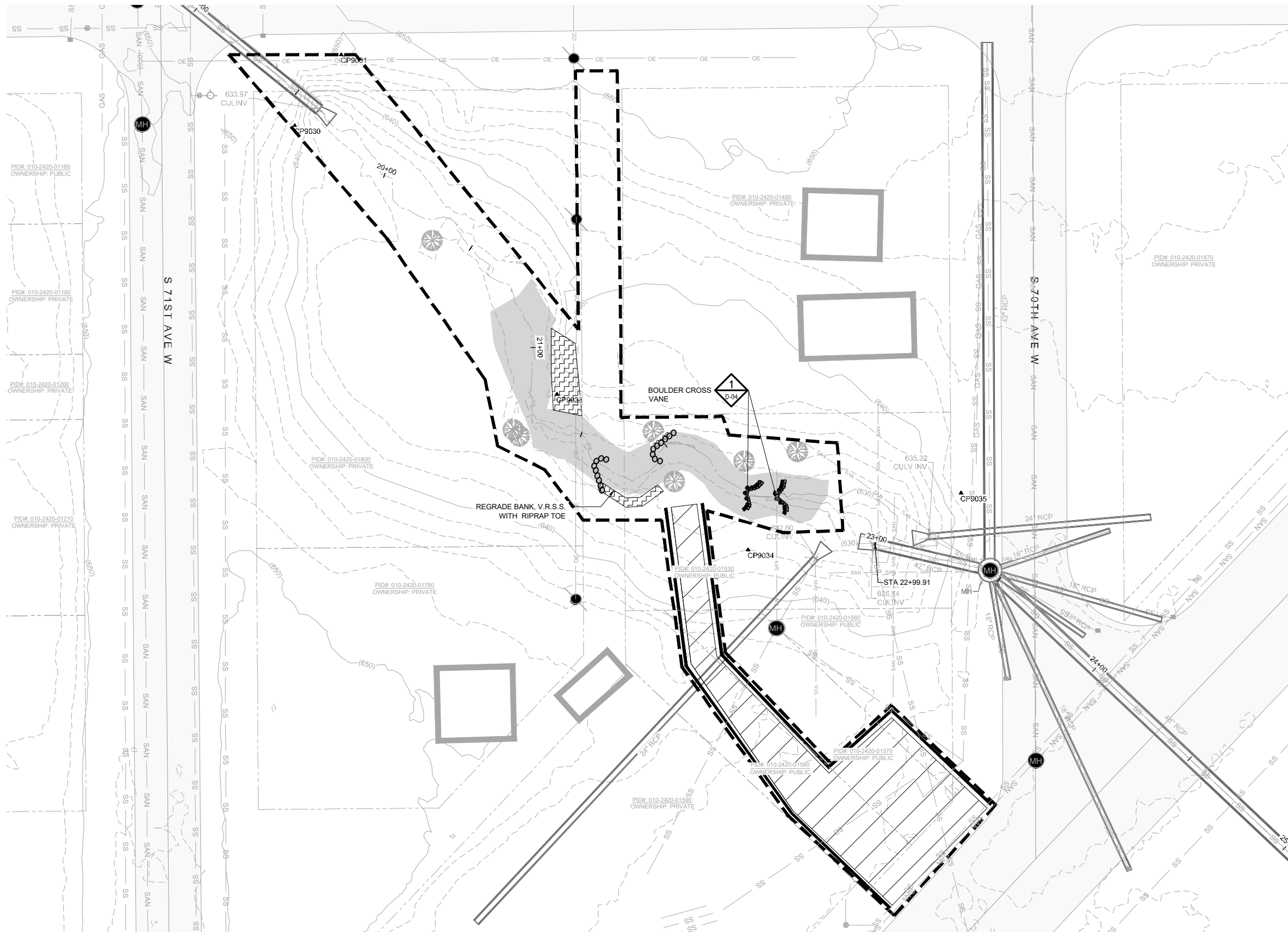
Revisions	
Date	By

Title: TRIBUTARY 1D SITE ACCESS, EROSION CONTROL AND REMOVALS

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-20**

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File #: -



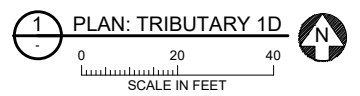
LEGEND

- (1040) EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING ROAD/TRAIL
- EXISTING PROPERTY LINE
- CONSTRUCTION LIMITS
- EXISTING CHANNEL OR TRIBUTARY CENTERLINE
- EXISTING BUILDING OR BUILT STRUCTURE
- EXISTING CULVERT, SIZE & MTL. AS NOTED
- EXISTING TREE, TO REMAIN (AS SURVEYED)
- CONTROL POINT
- VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
- LIVE STAKE PLANTING
- ACCESS/LAYDOWN AREA
- RIPRAP
- EXISTING RIPRAP
- OVERHEAD ELECTRIC
- UNDERGROUND SANITARY MAIN
- UNDERGROUND STORM MAIN
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- UNDERGROUND GAS
- UNDERGROUND TELEPHONE
- EXISTING FENCELINE
- SEDIMENT CONTROL LOG
- BOULDER CROSS VANE
- J-HOOK BOULDER VANE

CONTROL POINTS

POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9030	CP9030	642.97	412352.64	2853450.85
9031	CP9031	649.93	412379.79	2853468.69
9033	CP9033	633.52	412249.75	2853551.15
9034	CP9034	635.79	412190.18	2853624.44
9035	CP9035	643.35	412211.93	2853705.93

- NOTES:**
- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-23)
 - FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED AS BY ENGINEER.



PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88

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KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

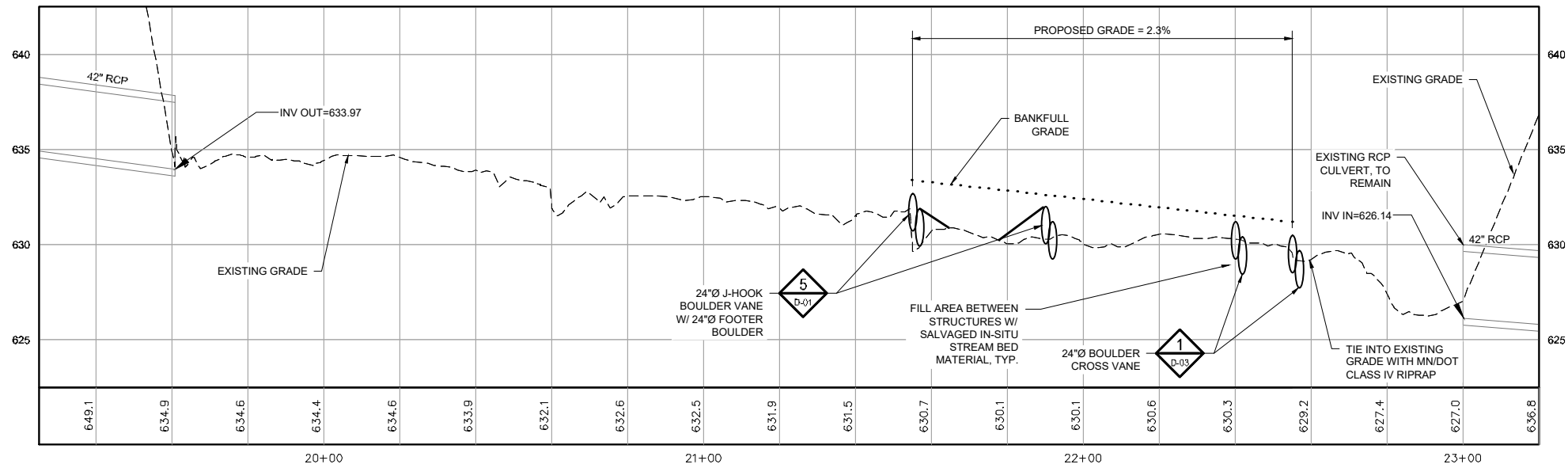
Date	By

Title: **TRIBUTARY 1D PLAN**

Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-21**

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 File #: -



LEGEND

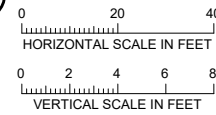
- EXISTING PROFILE
- DESIGN PROFILE
- ... BANKFULL GRADE
- ▭ EXISTING CULVERT, SIZE & MTL. AS NOTED
- ▨ ROCK RIFFLE
- IN-STREAM BOULDER FEATURE, AS NOTED

Station	Feature	Thalweg Elevation	Bankfull Elevation	Notes
21+55	J-Hook Boulder Vane	632.2	632.7	
21+90	J-Hook Boulder Vane	631.5	632.0	
22+40	Cross Vane	630.7	631.2	
22+55	Cross Vane	630.0	630.5	

NOTES:

- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-22).

1 PROFILE: TRIBUTARY 1D

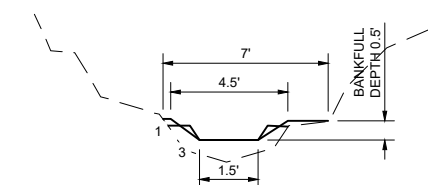


2 TABLE: TRIBUTARY 1D STATIONS

NOT TO SCALE

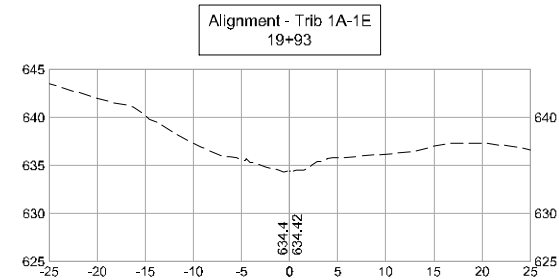
NOTES FOR ALL CROSS SECTIONS:

- ALL CROSS SECTIONS LOOKING TOWARD DOWNSTREAM DIRECTION.

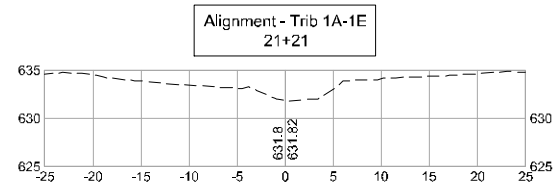
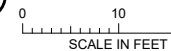


5 SECTION: RIFFLE, TYPICAL

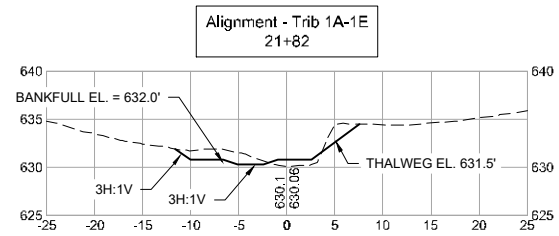
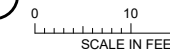
NOT TO SCALE



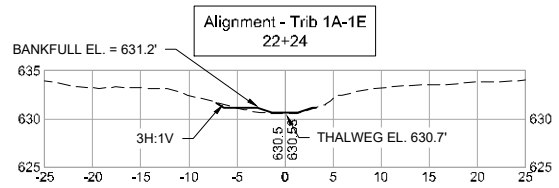
1 CROSS SECTION: TRIBUTARY 1D @ STN 19+93



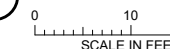
2 CROSS SECTION: TRIBUTARY 1D @ STN 21+21



3 CROSS SECTION: TRIBUTARY 1D @ STN 21+82



4 CROSS SECTION: TRIBUTARY 1D @ STN 22+24



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 Date: -

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KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **TRIBUTARY 1D PROFILE**
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
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 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-22**
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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIB 1D SECTIONS AND STRUCTURES TABLE

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: RRE 12/20	Drawn: AMW 01/21
Checked: JCO 12/20	Checked: AMW 01/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: **C-23**
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File #: -



- LEGEND**
- (1040) EXISTING INDEX CONTOUR
 - - - - - EXISTING INTERMEDIATE CONTOUR
 - ==== EXISTING ROAD/TRAIL
 - - - - - EXISTING PROPERTY LINE
 - |--- CONSTRUCTION LIMITS
 - |--- EXISTING CHANNEL OR TRIBUTARY CENTERLINE
 - ▭ EXISTING BUILDING OR BUILT STRUCTURE
 - ▭ EXISTING CULVERT, SIZE & MTL. AS NOTED
 - ⊙ EXISTING TREE, TO REMAIN (AS SURVEYED)
 - ⊙ CONTROL POINT
 - ▨ VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
 - ▨ RIFFLE
 - ▨ EROSION CONTROL BLANKET AND SEED
 - ▨ LIVE STAKE PLANTING
 - ▨ ACCESS/LAYDOWN AREA
 - ▨ RIPRAP
 - ▨ GRADING AREA
 - ▨ EXISTING RIPRAP
 - DT PROPOSED DRAIN TILE
 - OE OVERHEAD ELECTRIC
 - SAN UNDERGROUND SANITARY MAIN
 - SS UNDERGROUND STORM MAIN
 - > EXISTING CULVERT
 - UE UNDERGROUND ELECTRIC
 - GAS UNDERGROUND GAS
 - UT UNDERGROUND TELEPHONE
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 - ⊙ J-HOOK BOULDER VANE

- NOTES:**
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1 PLAN: TRIBUTARY 1D REVEGETATION

0 20 40
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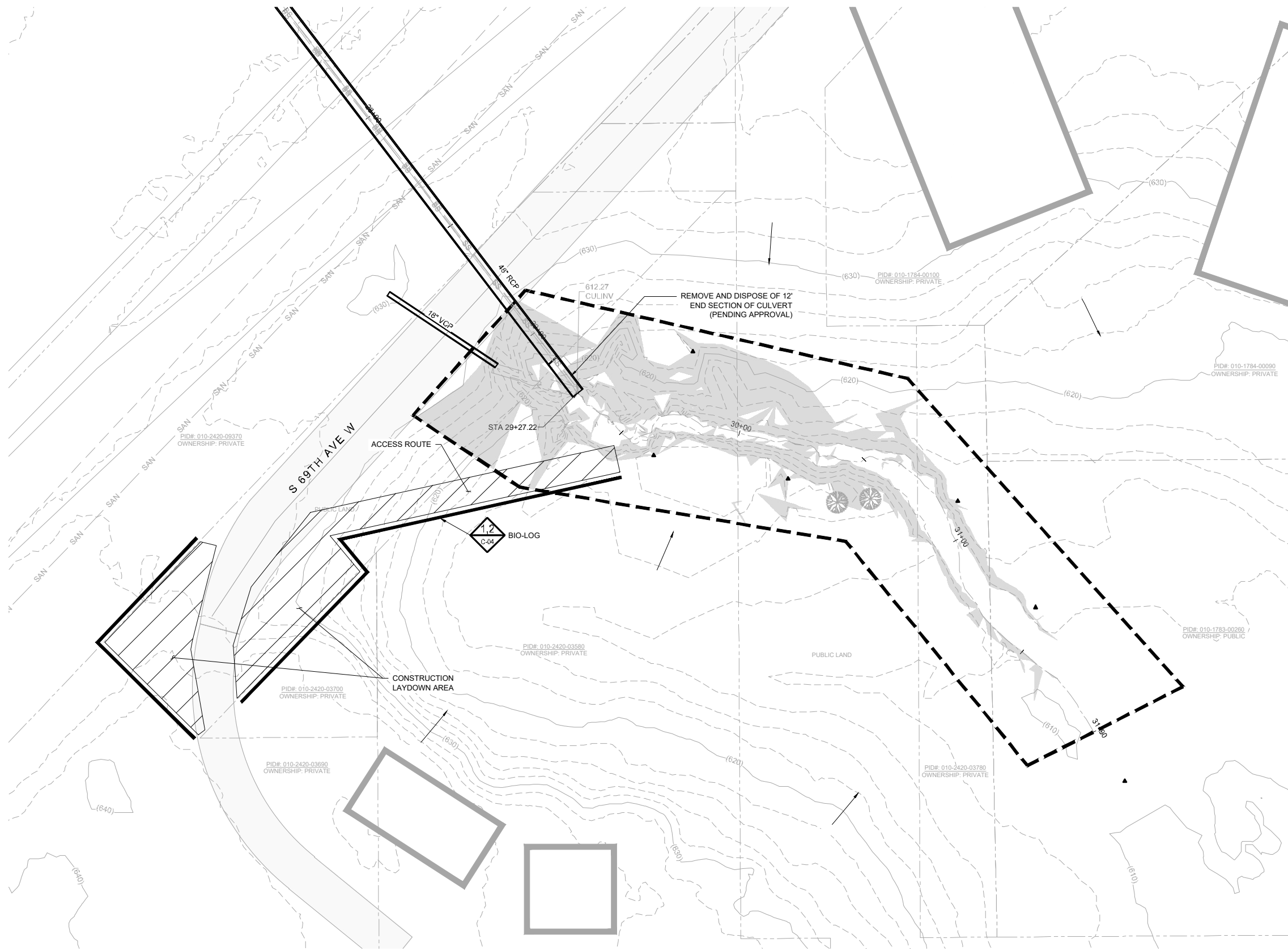
KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
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Title: TRIBUTARY 1D REVEGETATION PLAN

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LEGEND

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	CONSTRUCTION LIMITS
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	EXISTING BUILDING OR BUILT STRUCTURE
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	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
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 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

1 PLAN: TRIBUTARY 1E SITE ACCESS, EROSION CONTROL AND REMOVALS

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St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

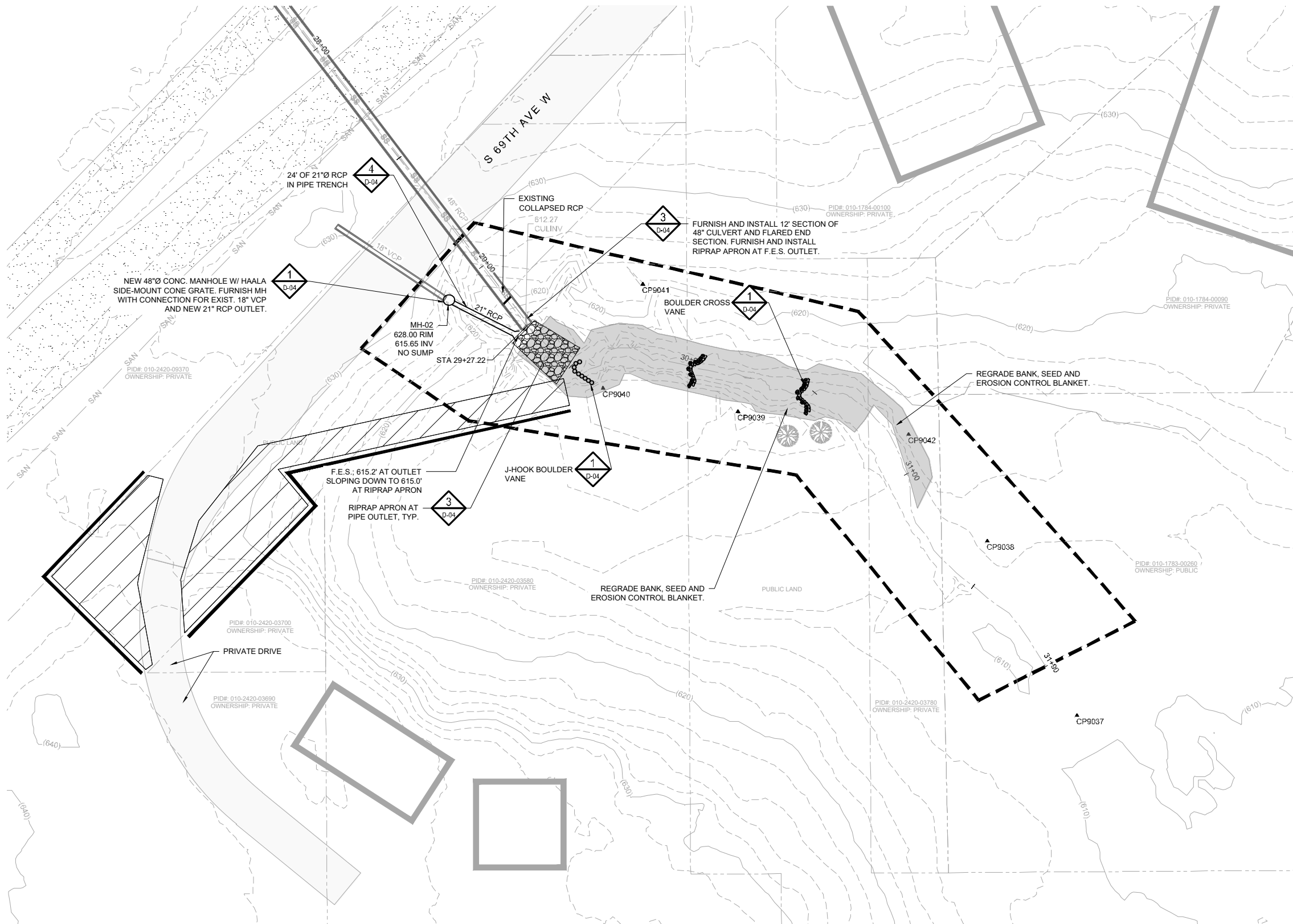
Revisions	
Date	By

Title: TRIBUTARY 1B SITE ACCESS, EROSION CONTROL AND REMOVALS

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
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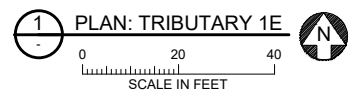
LEGEND

- (1040) EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING ROAD/TRAIL
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- CONTROL POINT
- VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
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- GAS UNDERGROUND GAS
- UT UNDERGROUND TELEPHONE
- X EXISTING FENCELINE
- SEDIMENT CONTROL LOG
- BOULDER CROSS VANE
- J-HOOK BOULDER VANE

CONTROL POINTS				
POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9037	CP9037	611.66	411561.87	2854179.87
9038	CP9038	612.76	411625.74	2854147.08
9039	CP9039	618.46	411674.06	2854055.98
9040	CP9040	618.77	411681.64	2854006.65
9041	CP9041	623.83	411719.71	2854021.09
9042	CP9042	615.31	411664.75	2854118.38

- NOTES:**
- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-28).
 - FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED BY ENGINEER.

PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88



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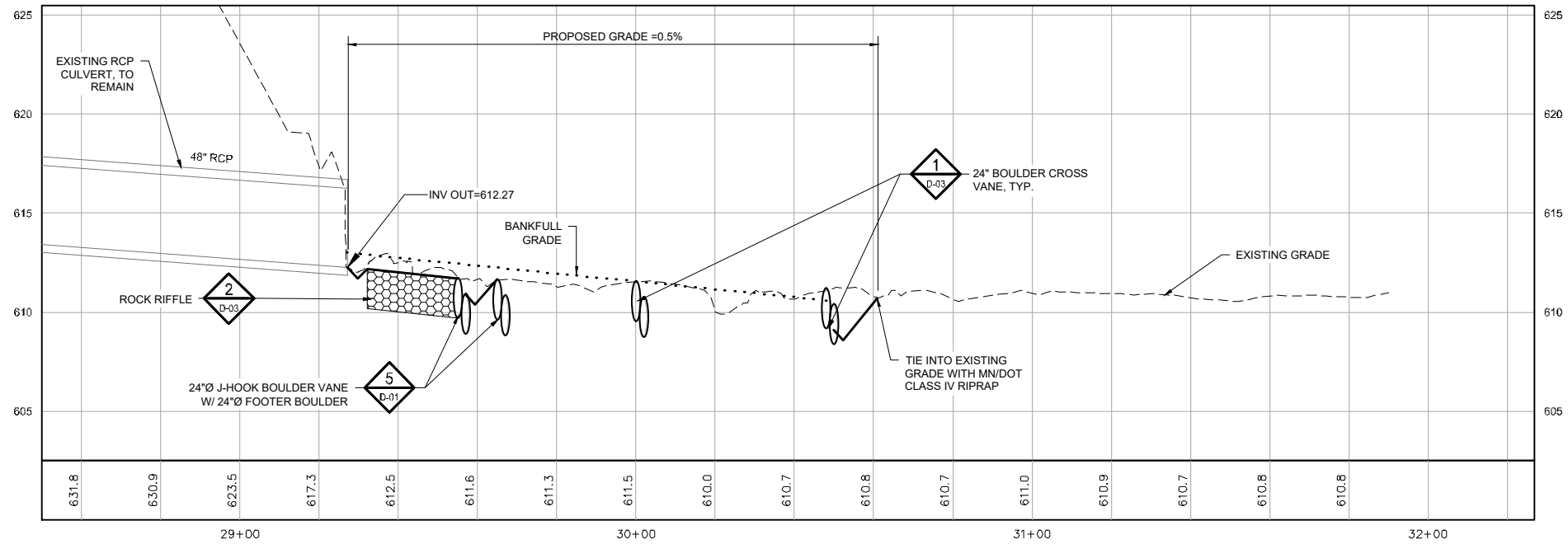
Operations Services
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 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
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Revisions	
Date	By

Title: TRIBUTARY 1E PLAN
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: C-26
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 File #: -



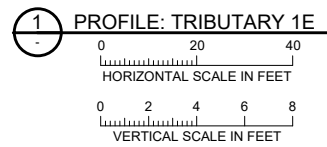
LEGEND

- EXISTING PROFILE
- DESIGN PROFILE
- ... BANKFULL GRADE
- ▭ EXISTING CULVERT, SIZE & MTL. AS NOTED
- ▨ ROCK RIFFLE
- ⊕ IN-STREAM BOULDER FEATURE, AS NOTED

Station	Feature	Thalweg Elevation	Bankfull Elevation	Riprap Length (ft)	Notes
29+27	Riprap outlet	612.3	613.0	28	
29+55	J-Hook Boulder Vane	612.1	612.8		
29+65	J-Hook Boulder Vane	612.0	612.7		
30+00	Cross Vane	611.9	612.6		
30+48	Cross Vane	611.8	612.5		

NOTES:

- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-28).



2 TABLE: TRIBUTARY 1E STATIONS
NOT TO SCALE

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 325 SOUTH LAKE AVENUE
 SUITE 700
 DULUTH, MN 55802
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 Name: JESSICA C. L. OLSON License #: 43102
 Date: -

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KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

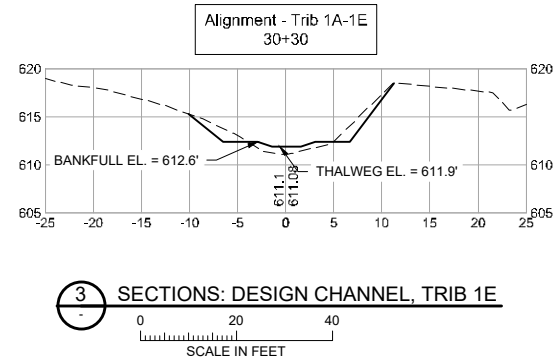
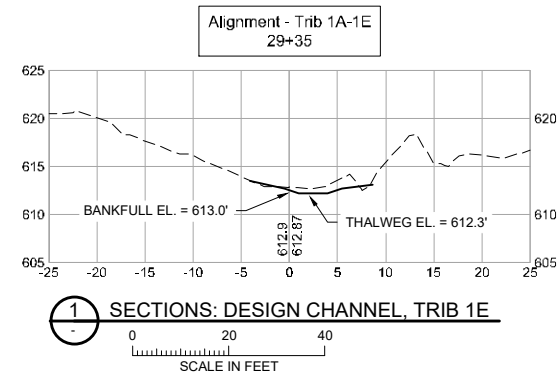
Date	By

Title: **TRIBUTARY 1E PROFILE**
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

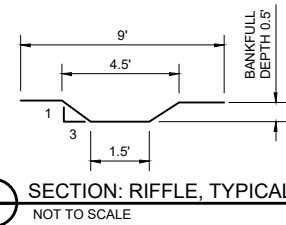
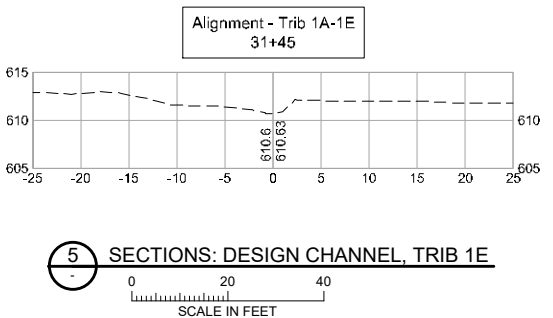
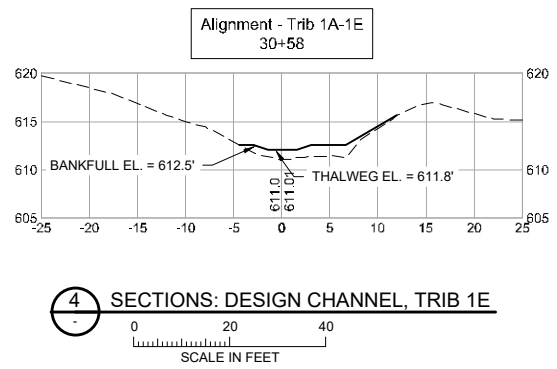
Sheet: **C-27**
 CC2: -
 File #: -

NOTES:

1. ALL CROSS SECTIONS LOOKING IN DOWNSTREAM DIRECTION.



Station	Feature	Thalweg Elevation	Bankfull Elevation	Riprap Length (ft)	Notes
29+27	Riprap outlet	612.3	613.0	28	
29+55	J-Hook Boulder Vane	612.1	612.8		
29+65	J-Hook Boulder Vane	612.0	612.7		
30+00	Cross Vane	611.9	612.6		
30+48	Cross Vane	611.8	612.5		



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Date: XX/XX/2021

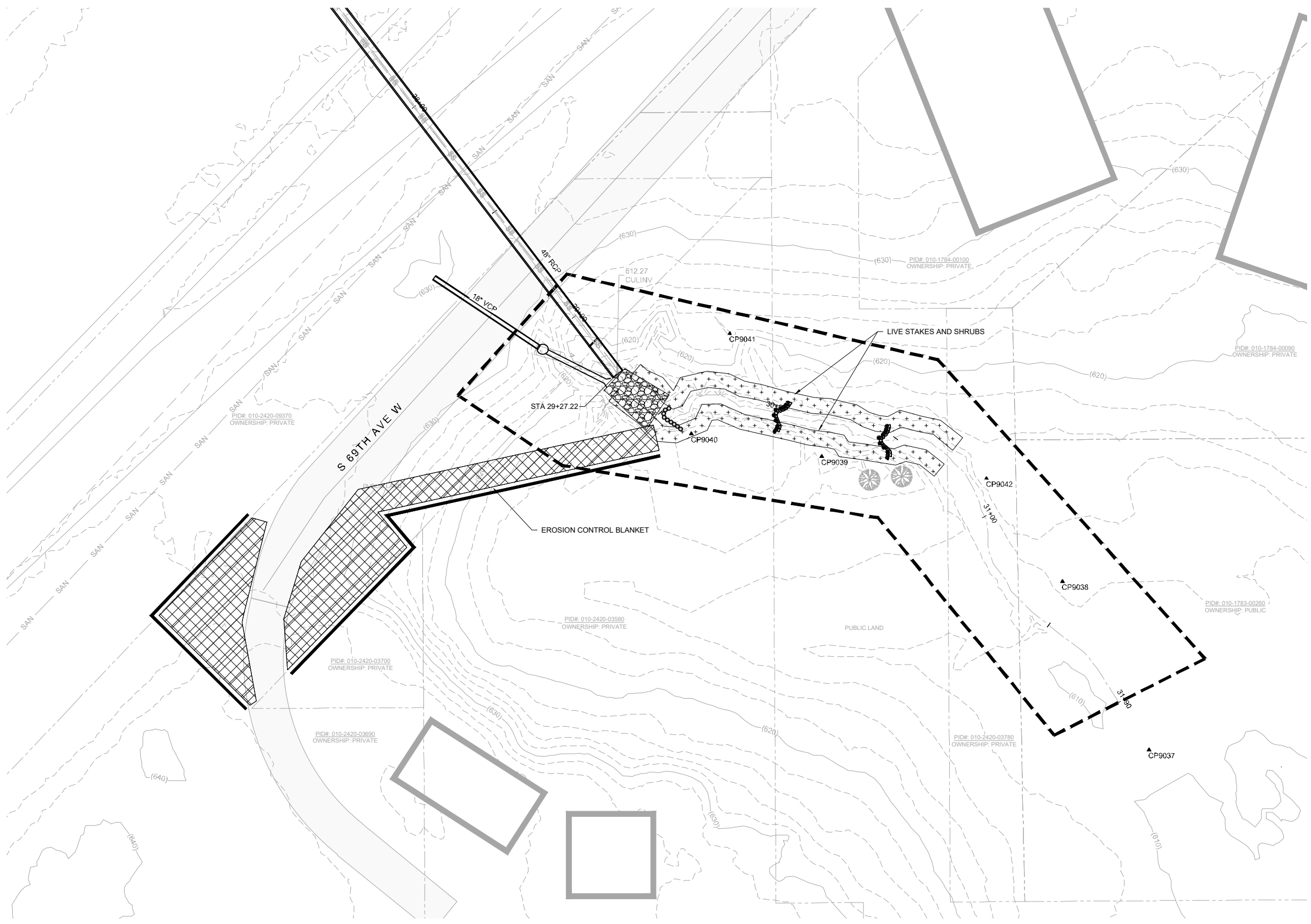
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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

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Date	By

Title: TRIB 1E SECTIONS AND STRUCTURES TABLE	
Survey: RRE 12/20	Designed: BARR 01/21
Drawn: RRE 12/20	Drawn: AMW 01/21
Checked: JCO 12/20	Checked: AMW 01/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: **C-28**
CC2: -
File #: -



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
	RIFFLE
	EROSION CONTROL BLANKET AND SEED
	LIVE STAKE PLANTING
	ACCESS/LAYDOWN AREA
	RIPRAP
	GRADING AREA
	EXISTING RIPRAP
	PROPOSED DRAIN TILE
	OVERHEAD ELECTRIC
	UNDERGROUND SANITARY MAIN
	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	BOULDER CROSS VANE
	J-HOOK BOULDER VANE

- NOTES:**
1. EROSION CONTROL BLANKET TO BE PLACED WHERE ALL LIVE STAKING IS SHOWN.
 2. ALL V.R.S.S. WILL INCLUDE LIVE STAKING.

1 PLAN: TRIBUTARY 1E REVEGETATION

0 20 40
SCALE IN FEET

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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

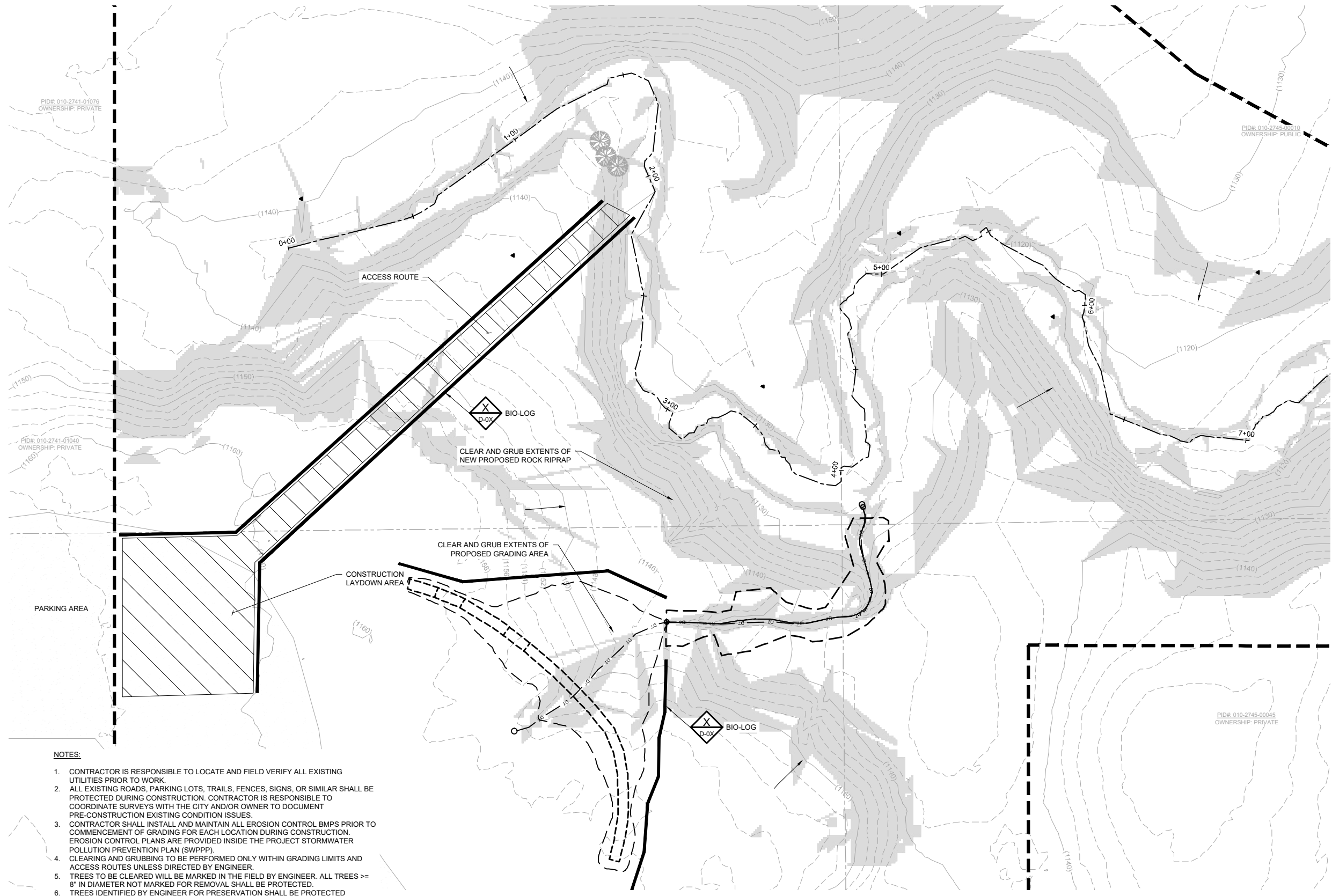
Revisions	
Date	By

Title: TRIBUTARY 1E REVEGETATION PLAN

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: **C-29**

CC2: -
File #: -



LEGEND

- (1040) EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING ROAD/TRAIL (IMPERVIOUS SURFACE)
- EXISTING PROPERTY LINE
- CONSTRUCTION LIMITS
- EXISTING CHANNEL OR TRIBUTARY CENTERLINE
- EXISTING BUILDING OR BUILT STRUCTURE
- EXISTING CULVERT, SIZE & MTL. AS NOTED
- EXISTING TREE, TO REMAIN (AS SURVEYED)
- CONTROL POINT
- ACCESS/LAYDOWN AREA
- EXISTING RIPRAP
- OE OVERHEAD ELECTRIC
- SAN UNDERGROUND SANITARY MAIN
- SS UNDERGROUND STORM MAIN
- > EXISTING CULVERT
- UE UNDERGROUND ELECTRIC
- GAS UNDERGROUND GAS
- UT UNDERGROUND TELEPHONE
- X EXISTING FENCELINE
- SEDIMENT CONTROL LOG
- SLOPE STEEPER THAN 3H:1V

CONTROL POINTS

POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9052	CP9052	1140.46	415386.79	2848863.72
9053	CP9053	1142.61	415304.48	2848841.74
9054	CP9054	1131.65	415207.59	2848790.86
9055	CP9055	1124.13	415154.57	2848790.86
9056	CP9056	1121.59	415094.94	2848850.39
9057	CP9057	1127.14	415015.42	2848835.17

PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88

- NOTES:**
- CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 - ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
 - CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
 - CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
 - TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
 - TREES IDENTIFIED BY ENGINEER FOR PRESERVATION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MnDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
 - CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
 - KINGSBURY CREEK AND TRIBUTARIES TO KINGSBURY CREEK ARE LISTED AS SPECIAL WATERS. REFER TO SECTION 4.0 OF THE SWPPP FOR ADDITIONAL DETAILS.
 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

1 PLAN: TRIBUTARY 4A ACCESS, EROSION CONTROL, AND REMOVALS

0 20 40
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License #: 43102
Date: —

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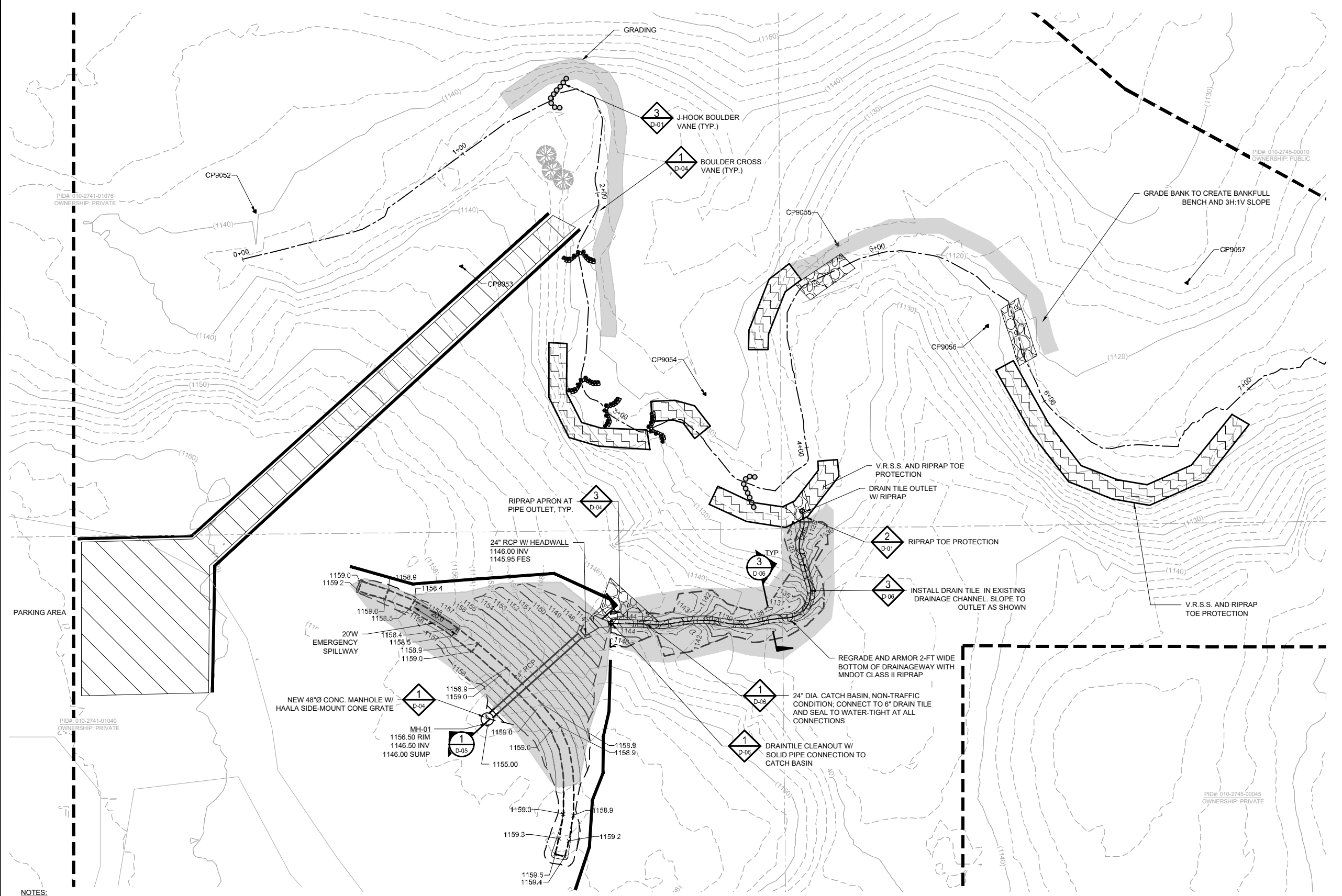
KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

Date	By

Title: TRIBUTARY 4A ACCESS, EROSION CONTROL, AND REMOVALS
Survey: RRE 12/20 **Designed:** BARR 01/21
Drawn: BARR 12/20 **Drawn:** BARR 02/21
Checked: JCO 12/20 **Checked:** JCO 02/21
Horz. datum: St. Louis Co. Coord. **Vert. datum:** NAVD88

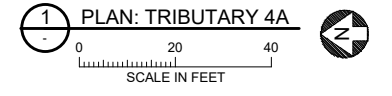
Sheet: C-30
CC2: -
File #: -



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
	GRADING
	ACCESS/LAYDOWN AREA
	RIPRAP
	EXISTING RIPRAP
	OVERHEAD ELECTRIC
	UNDERGROUND SANITARY MAIN
	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	SEDIMENT CONTROL LOG
	BOULDER CROSS VANE
	J-HOOK BOULDER VANE

- NOTES:**
- EXISTING CONTOUR DATA IS BASED ON SURVEYS PERFORMED BY BARR ENGINEERING NOVEMBER 2020 AND MAY 2021, AS SUPPLEMENTED WITH LIDAR DATA. BARR OBTAINED LIDAR DATA FROM MNDNR IN 2020.
 - FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED BY ENGINEER.



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Date: _____

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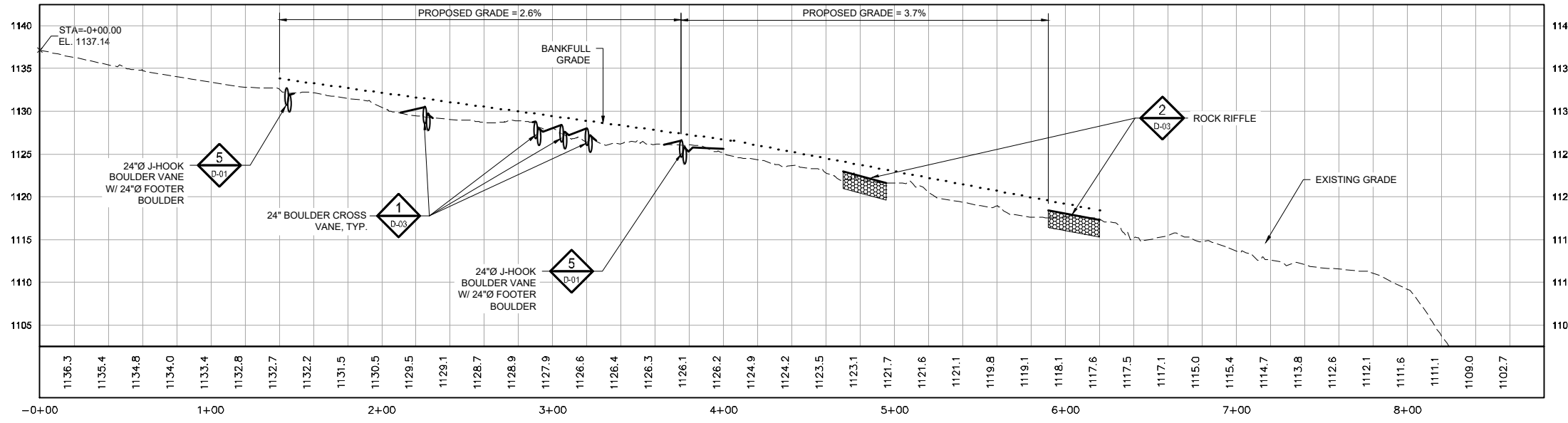
KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 4A PLAN

Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: C-31
CC2: -
File #: -

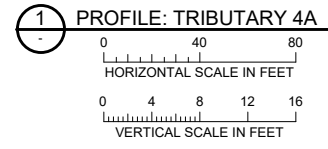


LEGEND

- EXISTING PROFILE
- DESIGN PROFILE
- ... BANKFULL GRADE
- [Hatched Box] EXISTING CULVERT, SIZE & MTL. AS NOTED
- [Stippled Box] ROCK RIFFLE
- [Wavy Line] IN-STREAM BOULDER FEATURE, AS NOTED

Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
1+40	J-Hook Boulder Vane	1132.7	1133.8		
2+25	Cross Vane	1130.5	1131.6		
2+90	Cross Vane	1128.8	1129.9		
3+05	Cross Vane	1128.4	1129.5		
3+20	Cross Vane	1128.0	1129.1		
3+75	J-Hook Boulder Vane	1126.6	1127.7		
4+70	Rock Riffle Start	1123.0	1124.1	25	
4+95	Rock Riffle End	1122.0	1123.1		
5+90	Rock Riffle Start	1118.4	1119.5	30	
6+20	Rock Riffle End	1117.3	1118.4		

- NOTES:**
- EXISTING CONTOUR DATA IS BASED ON SURVEYS PERFORMED BY BARR ENGINEERING NOVEMBER 2020 AS SUPPLEMENTED WITH LIDAR DATA. BARR OBTAINED LIDAR DATA FROM MNDNR IN 2020.
 - CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (C-32).



2 TABLE: TRIBUTARY 4A STATIONS
NOT TO SCALE

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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions

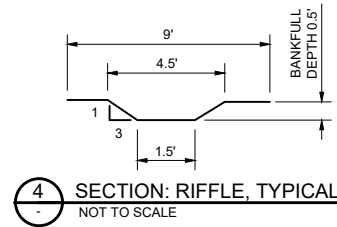
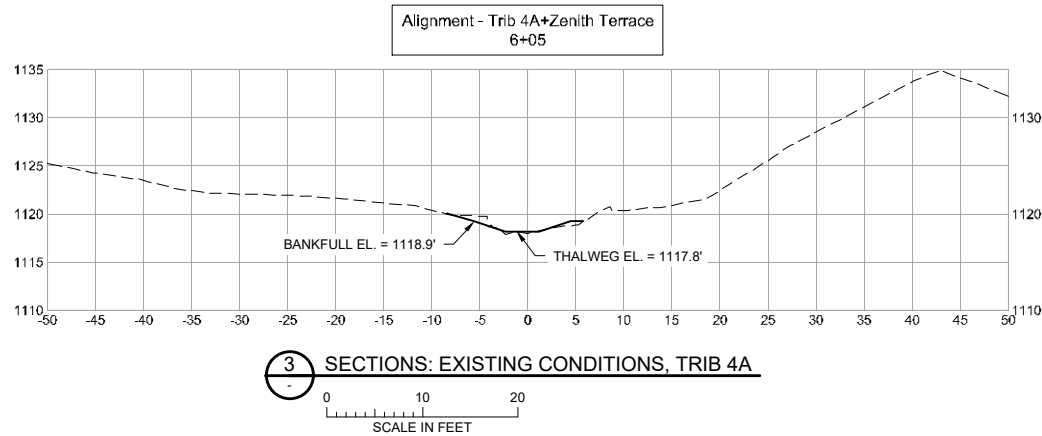
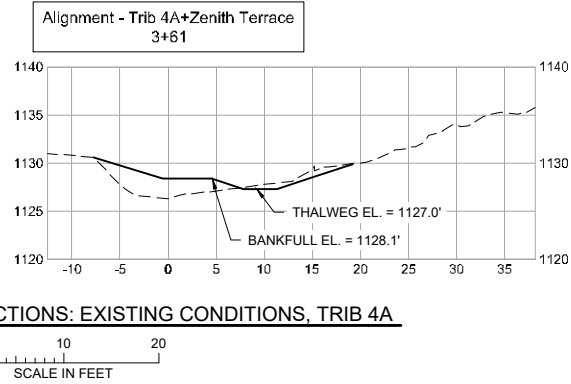
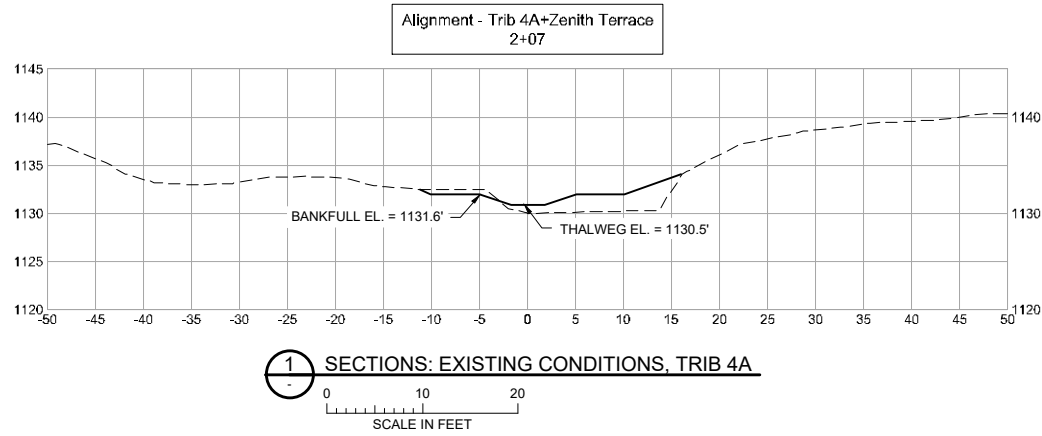
Date	By

Title: **TRIBUTARY 4A PROFILE**
Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-32**
CC2: -
File #: -

NOTES:

1. ALL CROSS SECTIONS LOOKING IN DOWNSTREAM DIRECTION.



Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
1+40	J-Hook Boulder Vane	1132.7	1133.8		
2+25	Cross Vane	1130.5	1131.6		
2+90	Cross Vane	1128.8	1129.9		
3+05	Cross Vane	1128.4	1129.5		
3+20	Cross Vane	1128.0	1129.1		
3+75	J-Hook Boulder Vane	1126.6	1127.7		
4+70	Rock Riffle Start	1123.0	1124.1	25	
4+95	Rock Riffle End	1122.0	1123.1		
5+90	Rock Riffle Start	1118.4	1119.5	30	
6+20	Rock Riffle End	1117.3	1118.4		

5 TABLE: TRIBUTARY 4A STATIONS
NOT TO SCALE

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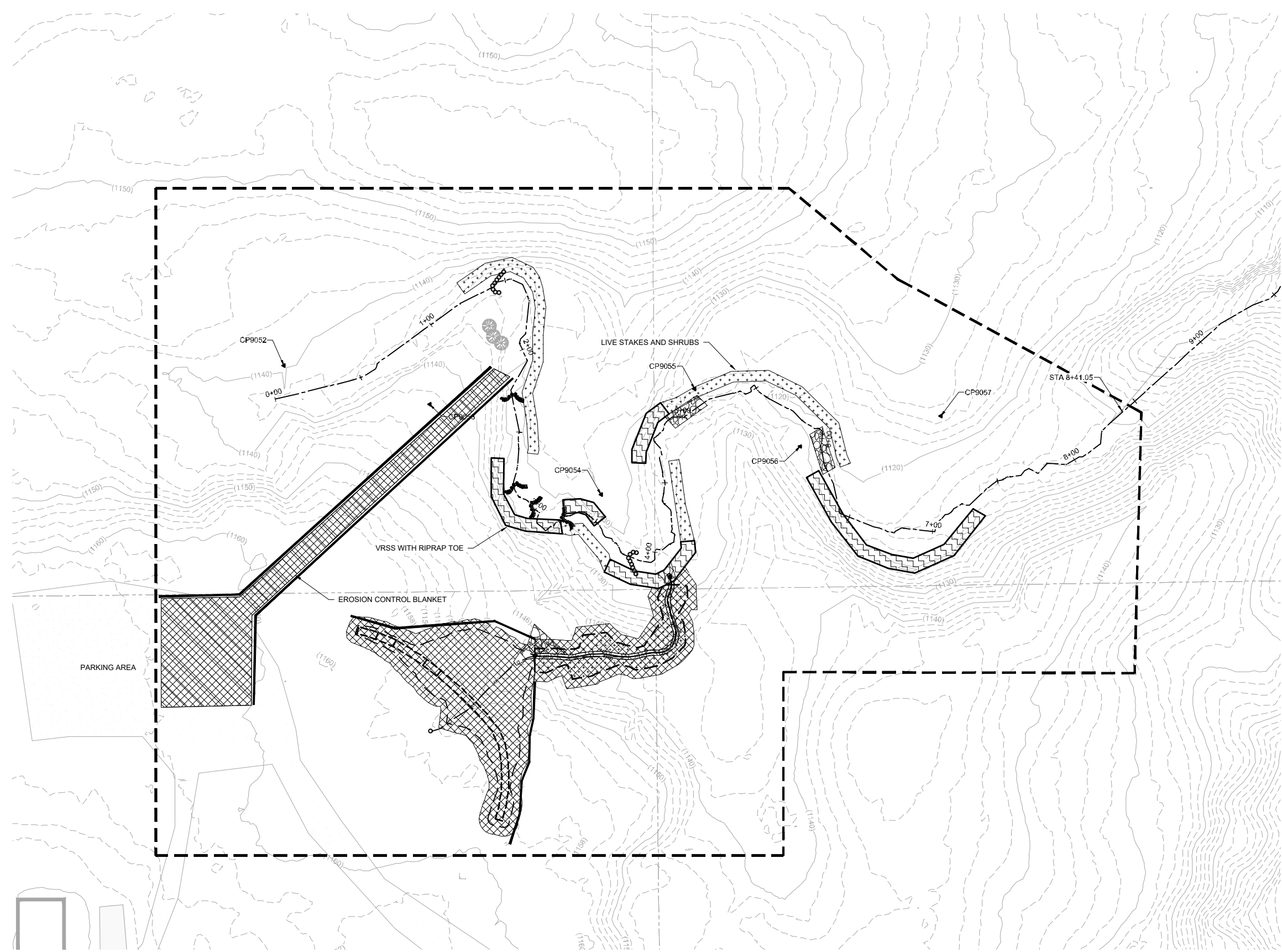
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DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **TRIB 4A SECTIONS AND STRUCTURES TABLE**

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: RRE 12/20 Drawn: AMW 01/21
Checked: JCO 12/20 Checked: AMW 01/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-33**
CC2: -
File #: -



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
	EXISTING BUILDING OR BUILT STRUCTURE
	EXISTING CULVERT, SIZE & MTL. AS NOTED
	EXISTING TREE, TO REMAIN (AS SURVEYED)
	CONTROL POINT
	VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
	RIFFLE
	EROSION CONTROL BLANKET AND SEED
	LIVE STAKE PLANTING
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	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	BOULDER CROSS VANE
	J-HOOK BOULDER VANCE

- NOTES:**
1. EROSION CONTROL BLANKET TO BE PLACED WHERE ALL LIVE STAKING IS SHOWN.
 2. ALL V.R.S.S. WILL INCLUDE LIVE STAKING.

1 PLAN: TRIBUTARY 4A REVEGETATION
 0 30 60
 SCALE IN FEET

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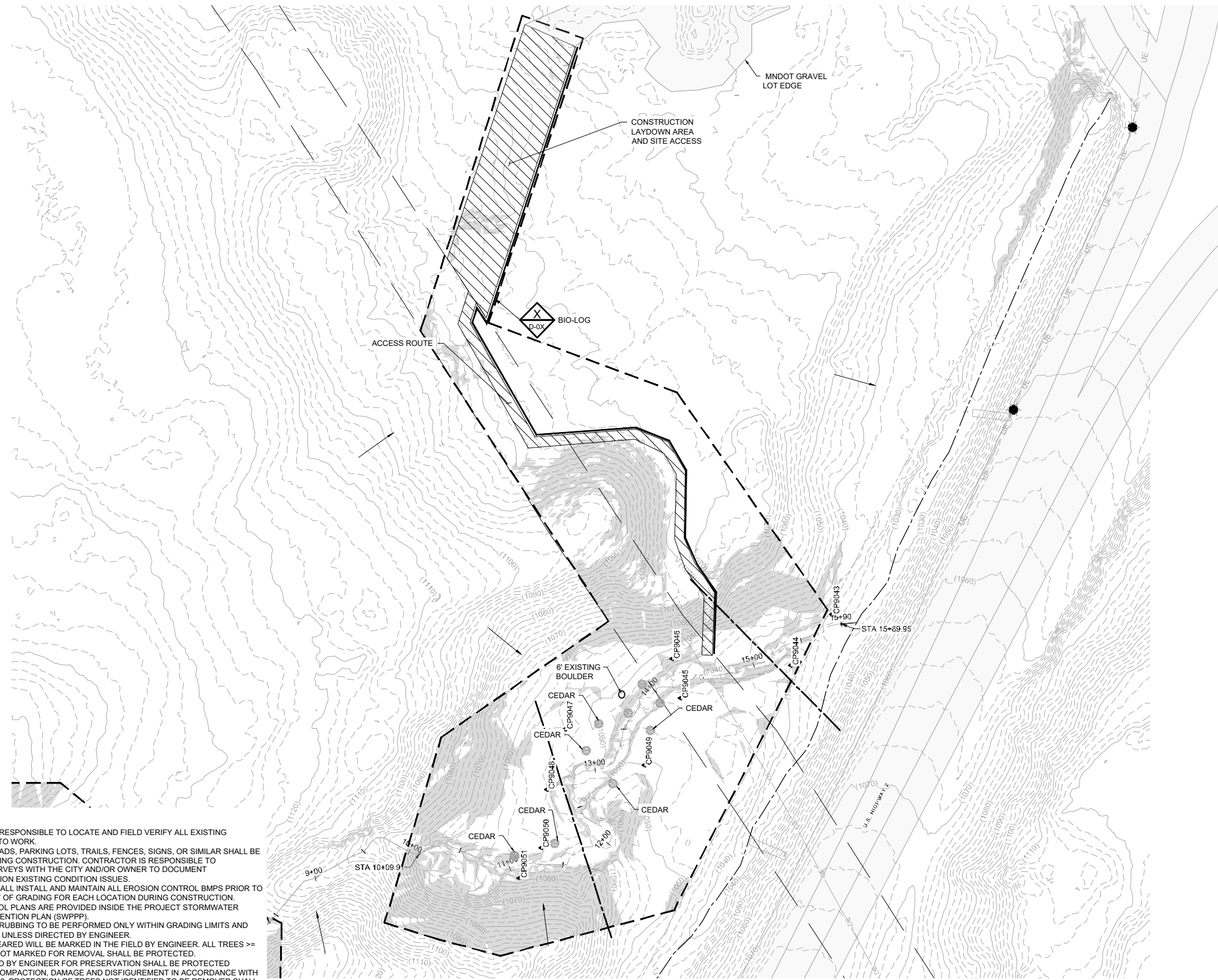
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 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
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Revisions	
Date	By

Title: TRIBUTARY 4A REVEGETATION PLAN
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 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-34**
 CC2: -
 File #: -



LEGEND

- (1040) EXISTING INDEX CONTOUR
- - - - - EXISTING INTERMEDIATE CONTOUR
- ==== EXISTING ROAD/TRAIL (IMPERVIOUS SURFACE)
- - - - - EXISTING PROPERTY LINE
- CONSTRUCTION LIMITS
- - - - - EXISTING CHANNEL OR TRIBUTARY CENTERLINE
- [] EXISTING BUILDING OR BUILT STRUCTURE
- [] EXISTING CULVERT, SIZE & MTL. AS NOTED
- [] EXISTING TREE, TO REMAIN (AS SURVEYED)
- [] CONTROL POINT
- [] ACCESS/LAYDOWN AREA
- [] EXISTING RIPRAP
- OE OVERHEAD ELECTRIC
- SAN UNDERGROUND SANITARY MAIN
- SS UNDERGROUND STORM MAIN
- > EXISTING CULVERT
- UE UNDERGROUND ELECTRIC
- GAS UNDERGROUND GAS
- UT UNDERGROUND TELEPHONE
- X EXISTING FENCELINE
- [] SEDIMENT CONTROL LOG
- [] SLOPE STEEPER THAN 3H:1V

- NOTES:**
- CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
 - ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
 - CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPs PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
 - CLEARING AND GRUBBING TO BE PERFORMED ONLY WITHIN GRADING LIMITS AND ACCESS ROUTES UNLESS DIRECTED BY ENGINEER.
 - TREES TO BE CLEARED WILL BE MARKED IN THE FIELD BY ENGINEER. ALL TREES >= 8" IN DIAMETER NOT MARKED FOR REMOVAL SHALL BE PROTECTED.
 - TREES IDENTIFIED BY ENGINEER FOR PRESERVATION SHALL BE PROTECTED AGAINST ROOT COMPACTION, DAMAGE AND DISFIGUREMENT IN ACCORDANCE WITH MNDOT SPEC. 2572. PROTECTION OF TREES NOT IDENTIFIED TO BE REMOVED SHALL BE INCIDENTAL.
 - CONTRACTOR SHALL TAKE PRECAUTIONS TO MINIMIZE THE TRANSFER OF AQUATIC AND TERRESTRIAL INVASIVE SPECIES TO THE MAXIMUM EXTENT POSSIBLE.
 - KINGSBURY CREEK AND TRIBUTARIES TO KINGSBURY CREEK ARE LISTED AS SPECIAL WATERS. REFER TO SECTION 4.0 OF THE SWPPP FOR ADDITIONAL DETAILS.
 - REFER TO SECTION 4.1.2 FOR STABILIZATION PRACTICES IF DRAINAGE DITCHES OR SWALES WILL BE DISTURBED.

1 PLAN: TRIBUTARY 4B ACCESS, EROSION CONTROL, AND REMOVALS

0 40 80
SCALE IN FEET

CONTROL POINTS				
POINT #	DESCRIPTION	ELEVATION	NORTHING	EASTING
9043	CP9043	1034.77	414406.44	2849116.12
9044	CP9044	1042.12	414443.29	2849070.17
9045	CP9045	1044.42	414542.62	2849040.46
9046	CP9046	1047.74	414550.39	2849075.98
9047	CP9047	1053.46	414646.77	2849012.40
9048	CP9048	1053.91	414663.23	2848958.09
9049	CP9049	1049.79	414575.49	2848979.97
9050	CP9050	1056.14	414668.34	2848905.65
9051	CP9051	1057.69	414688.04	2848878.21

PROJECT DATUM:
 HORIZONTAL: MINNESOTA STATE PLANE NORTH, US FOOT, NAD83(2011)
 VERTICAL: NAVD88

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Name: JESSICA C. L. OLSON License #: 43102
 Date:

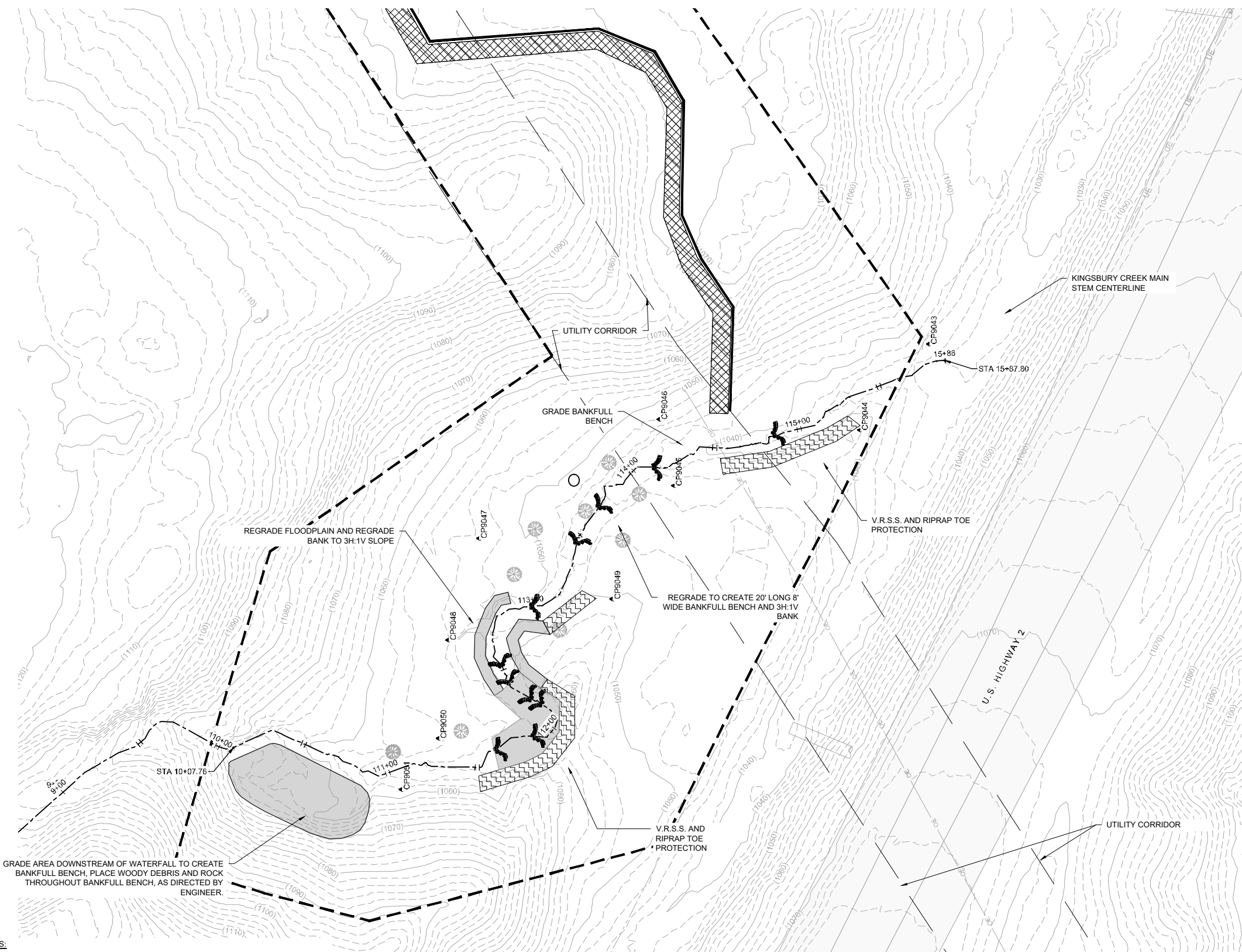
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 Safety
 Facilities
 Materials
 Equipment
 Field Operations
 Information Management

KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: ACCESS, EROSION CONTROL, AND REMOVALS
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horiz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

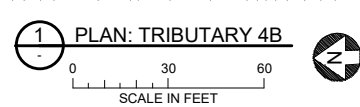
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 CC2: -
 File #: -



LEGEND

	(1040)	EXISTING INDEX CONTOUR
		EXISTING INTERMEDIATE CONTOUR
		EXISTING ROAD/TRAIL
		EXISTING PROPERTY LINE
		CONSTRUCTION LIMITS
		EXISTING CHANNEL OR TRIBUTARY CENTERLINE
		EXISTING BUILDING OR BUILT STRUCTURE
		EXISTING CULVERT, SIZE & MTL. AS NOTED
		EXISTING TREE, TO REMAIN (AS SURVEYED)
		CONTROL POINT
		VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
		LIVE STAKE PLANTING
		ACCESS/LAYDOWN AREA
		RIPRAP
		EXISTING RIPRAP
	OE	OVERHEAD ELECTRIC
	SAN	UNDERGROUND SANITARY MAIN
	SS	UNDERGROUND STORM MAIN
	UE	EXISTING CULVERT
	UE	UNDERGROUND ELECTRIC
	GAS	UNDERGROUND GAS
	UT	UNDERGROUND TELEPHONE
	X	EXISTING FENCELINE
		SEDIMENT CONTROL LOG
		BOULDER CROSS VANE
		J-HOOK BOULDER VANE

- NOTES:**
- EXISTING CONTOUR DATA IS BASED ON SURVEYS PERFORMED BY BARR ENGINEERING NOVEMBER 2020 AS SUPPLEMENTED WITH LIDAR DATA. BARR OBTAINED LIDAR DATA FROM MNDNR IN 2020.
 - FINAL CHANNEL ALIGNMENT, GRADING, AND STRUCTURE LOCATION SHALL BE FIELD-MODIFIED AS DIRECTED BY ENGINEER.



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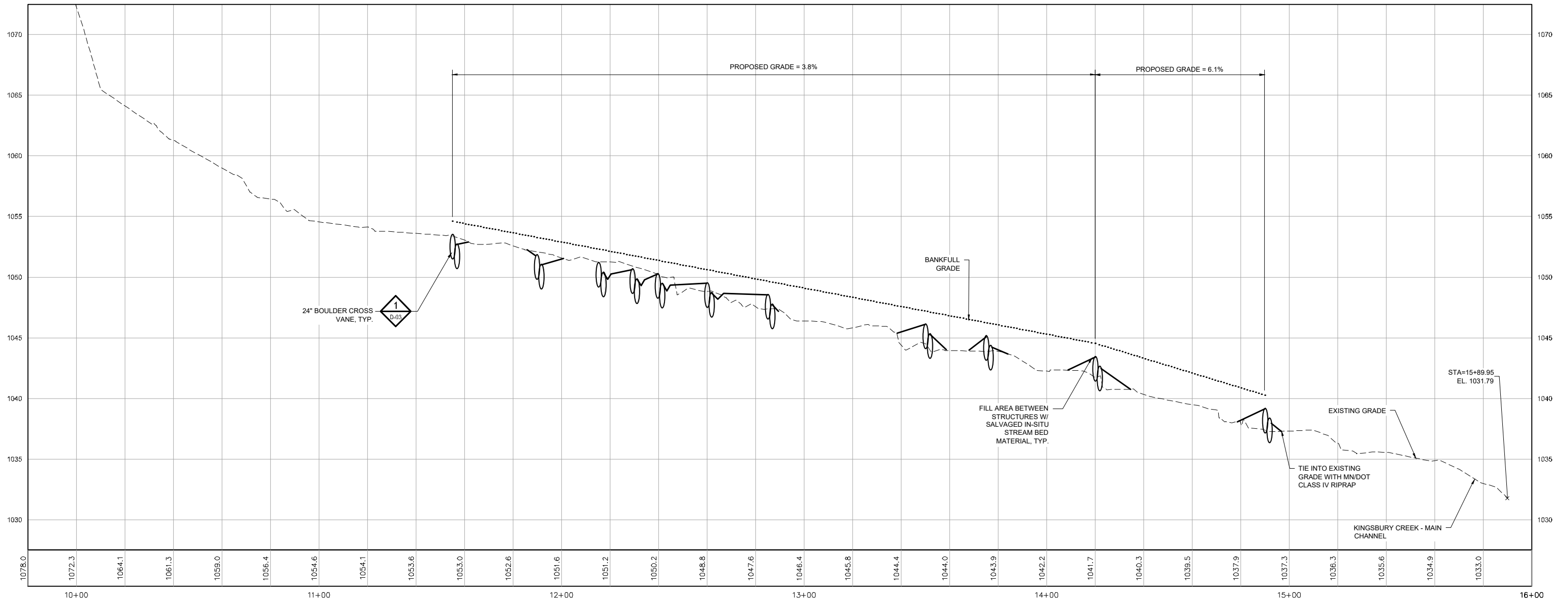
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KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: TRIBUTARY 4B PLAN	
Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

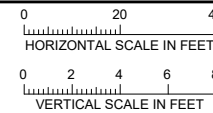
Sheet: C-36
CC2: -
File #: -



NOTES:

- CHANNEL SHALL BE GRADED AND RIPRAP PLACED BETWEEN BOULDER VANES TO CREATE RIFFLES AND POOLS, PER STRUCTURE TABLE (SHEET C-37).

1 PROFILE: TRIBUTARY 4B



LEGEND

- EXISTING PROFILE
- DESIGN PROFILE
- BANKFULL GRADE
- [Hatched Box] EXISTING CULVERT, SIZE & MTL. AS NOTED
- [Rock Pattern Box] ROCK RIFFLE
- [Boulder Symbol] IN-STREAM BOULDER FEATURE, AS NOTED

Station	Feature	Thalweg Elevation	Bankfull Elevation	Riffle Length (ft)	Notes
11+55	Cross Vane	1053.3	1054.4		
11+90	Cross Vane	1051.8	1052.9		
12+15	Cross Vane	1051.2	1052.3		
12+28	Cross Vane	1050.7	1051.8	30	
12+40	Cross Vane	1050.2	1051.3		
12+60	Cross Vane	1049.5	1050.6		
12+85	Cross Vane	1048.6	1049.7		
13+50	Cross Vane	1046.1	1047.2		
13+75	Cross Vane	1045.1	1046.2		
14+20	Cross Vane	1043.4	1044.5		
14+90	Cross Vane	1039.2	1040.3		

2 TABLE: TRIBUTARY 4B STATIONS
NOT TO SCALE

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St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

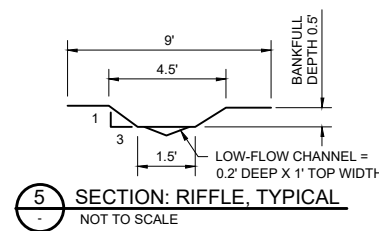
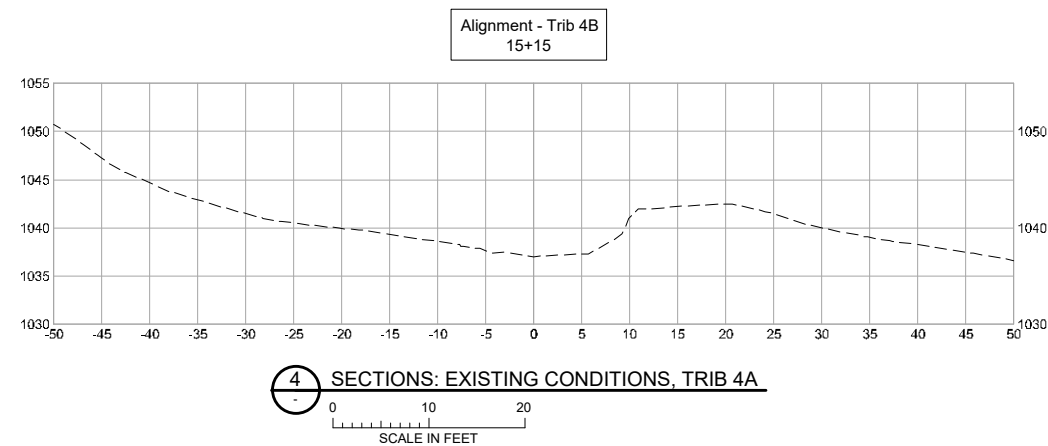
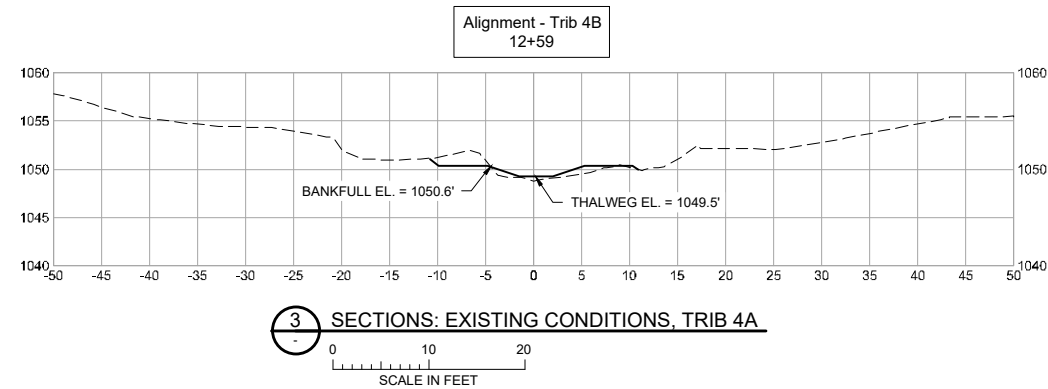
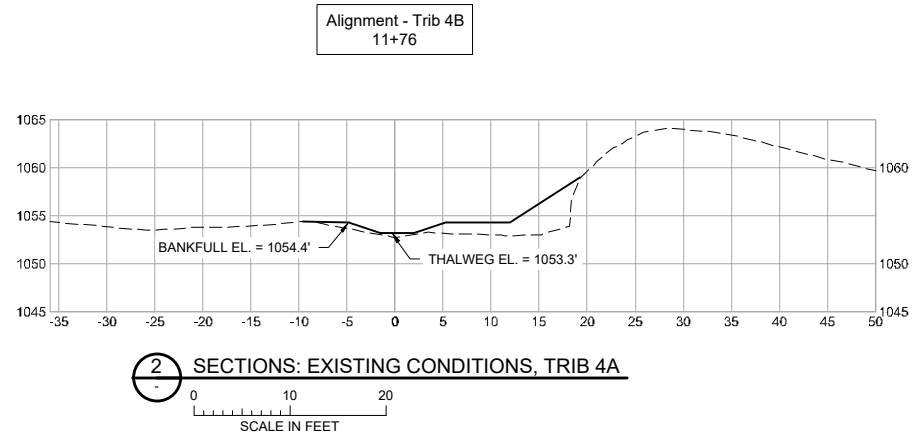
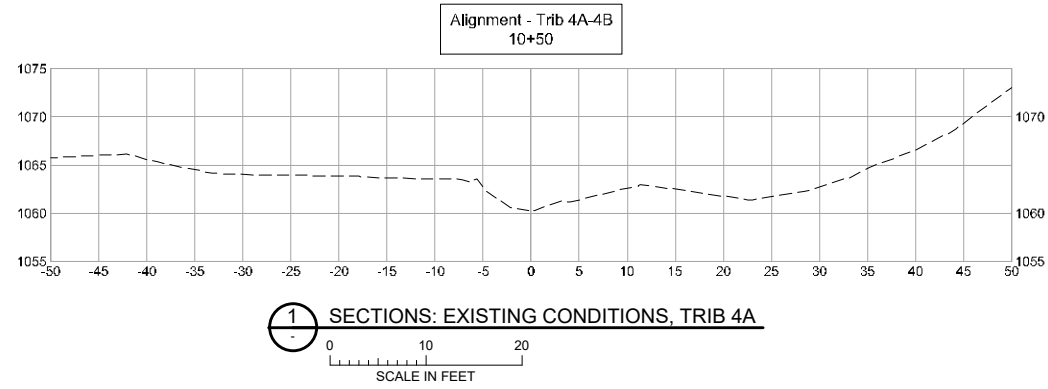
Revisions	
Date	By

Title: **TRIBUTARY 4B PROFILE**
Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 02/21
Checked: JCO 12/20 Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **C-37**
CC2: -
File #: -

NOTES:

1. ALL CROSS SECTIONS LOOKING IN DOWNSTREAM DIRECTION.



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Date: XX/XX/2021

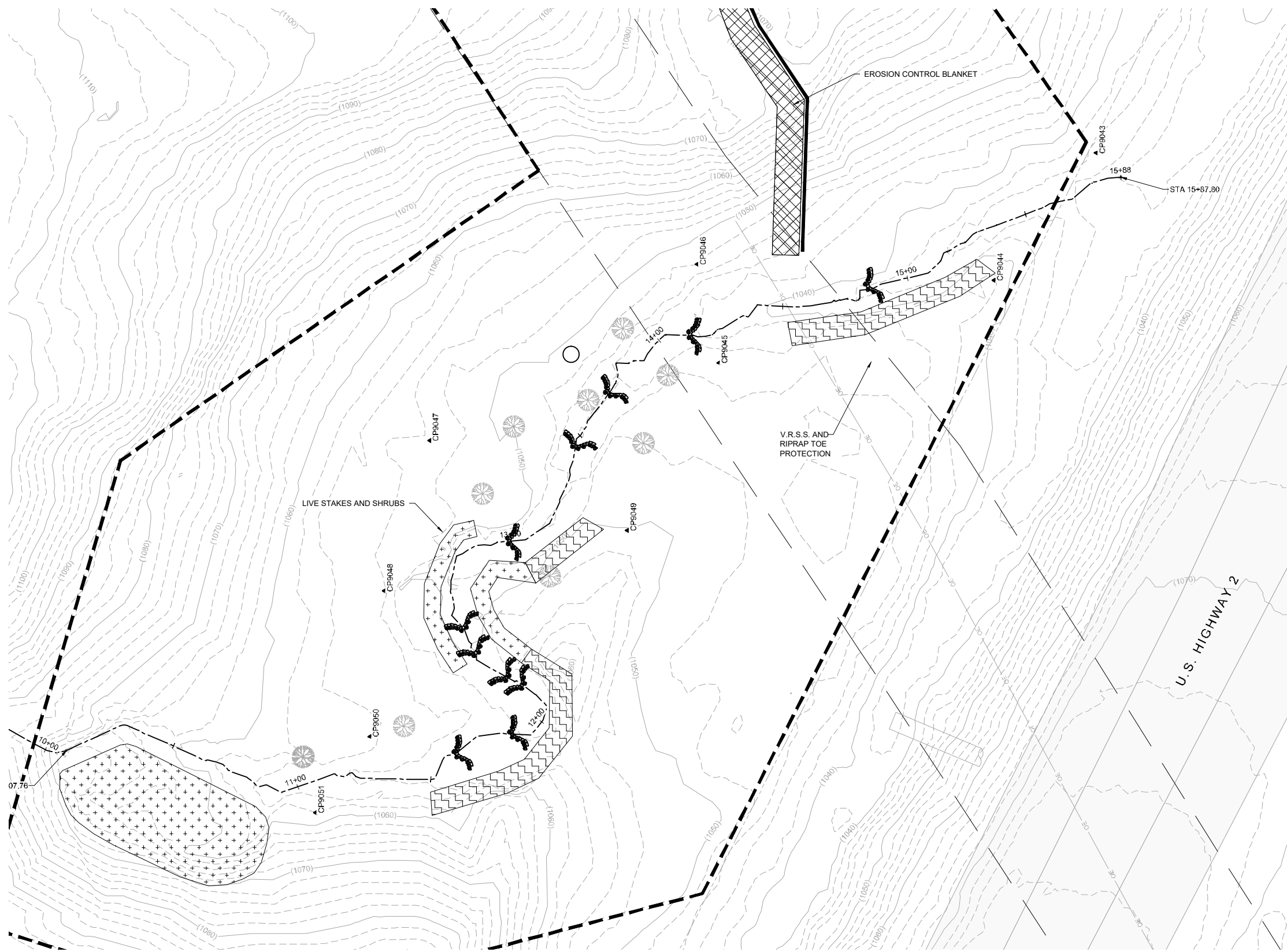
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Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
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Revisions	
Date	By

Title: TRIB 4B SECTIONS AND STRUCTURES TABLE	
Survey: RRE 12/20	Designed: BARR 01/21
Drawn: RRE 12/20	Drawn: AMW 01/21
Checked: JCO 12/20	Checked: AMW 01/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: C-38
CC2: -
File #: -



LEGEND

	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
	EXISTING ROAD/TRAIL
	EXISTING PROPERTY LINE
	CONSTRUCTION LIMITS
	EXISTING CHANNEL OR TRIBUTARY CENTERLINE
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	RIFFLE
	EROSION CONTROL BLANKET AND SEED
	LIVE STAKE PLANTING
	ACCESS/LAYDOWN AREA
	RIPRAP
	GRADING AREA
	EXISTING RIPRAP
	PROPOSED DRAIN TILE
	OVERHEAD ELECTRIC
	UNDERGROUND SANITARY MAIN
	UNDERGROUND STORM MAIN
	EXISTING CULVERT
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND TELEPHONE
	EXISTING FENCELINE
	BOULDER CROSS VANE
	J-HOOK BOULDER VANE

- NOTES:**
1. EROSION BLANKET TO BE PLACED WHERE ALL LIVE STAKING IS SHOWN.
 2. ALL V.R.S.S. WILL INCLUDE LIVE STAKING.

1 PLAN: TRIBUTARY 4B REVEGETATION

SCALE IN FEET

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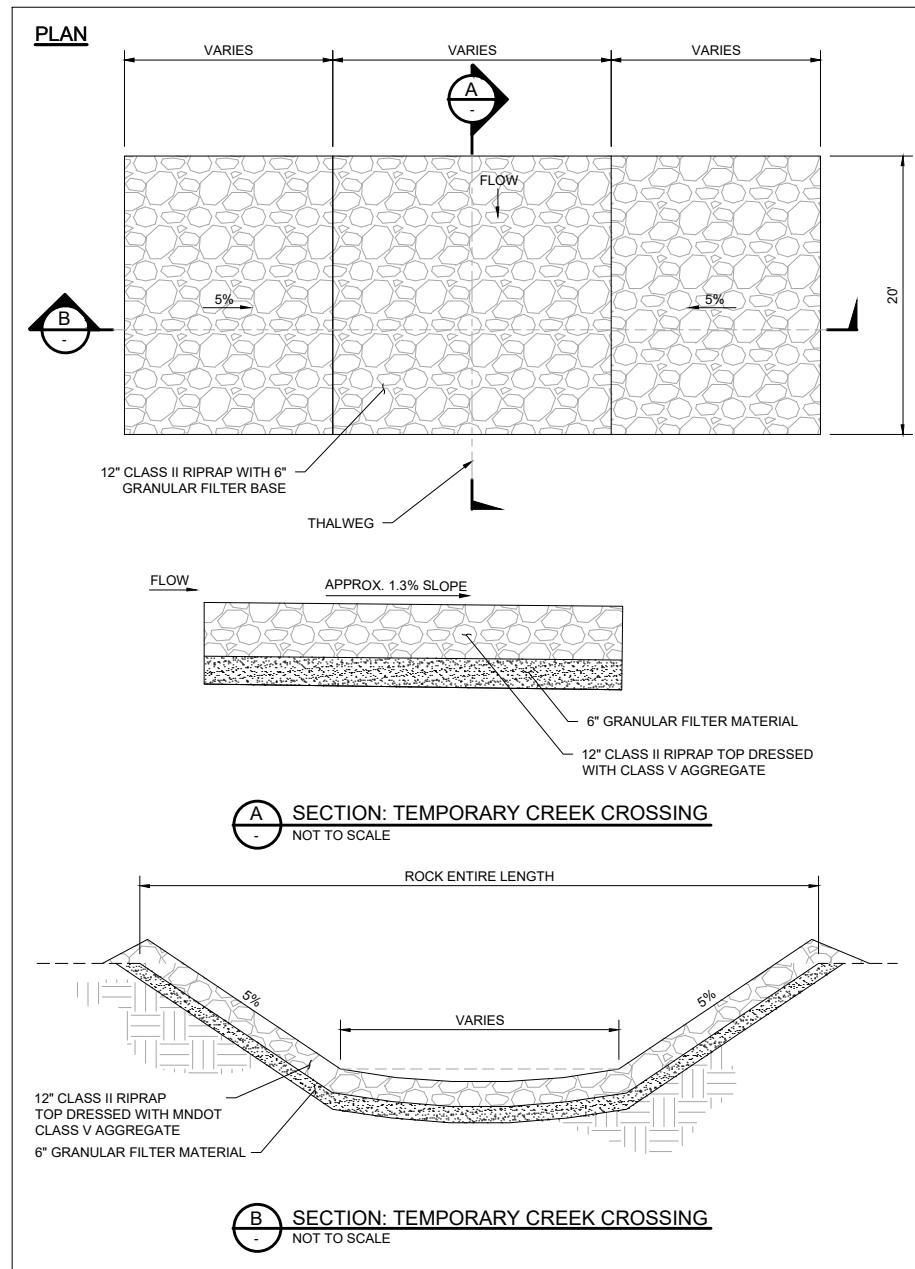
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 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

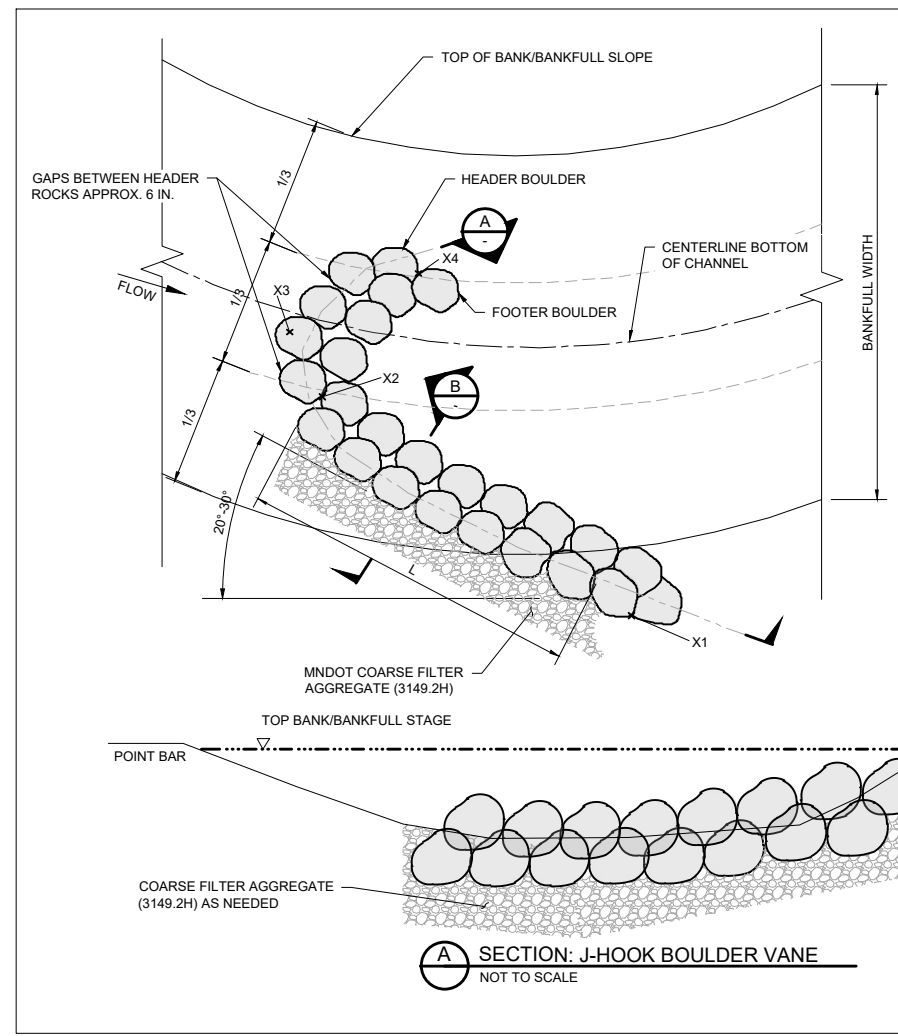
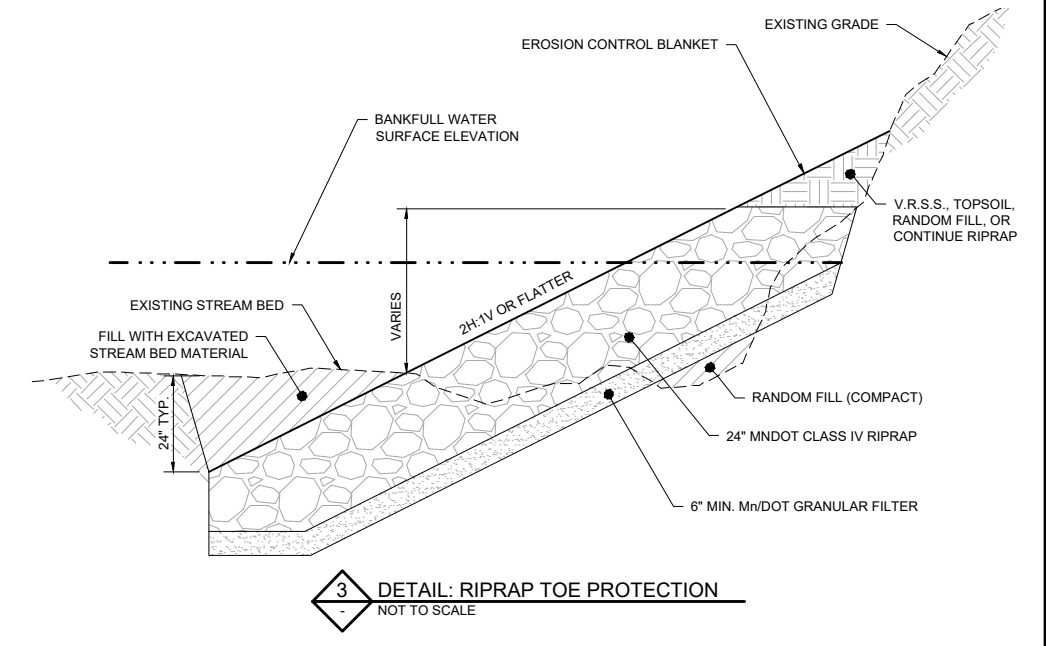
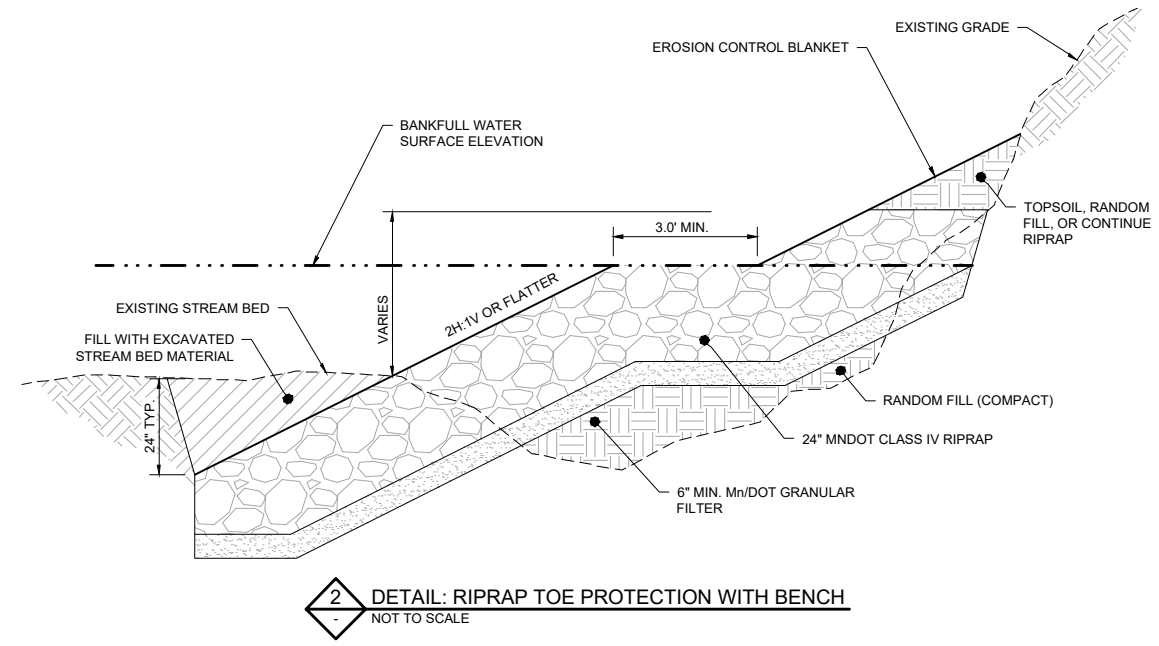
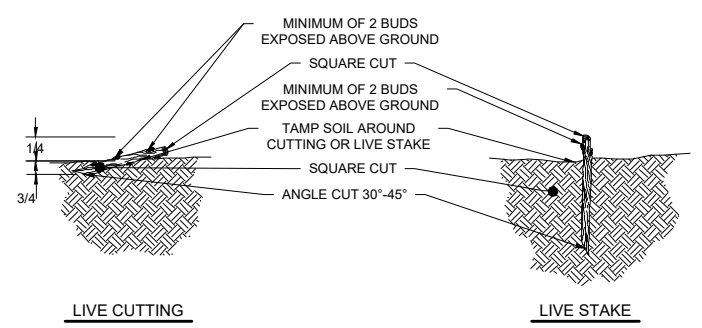
Revisions	
Date	By

Title: TRIBUTARY 4B REVEGETATION PLAN	
Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

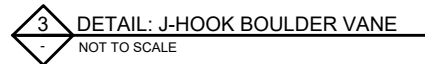
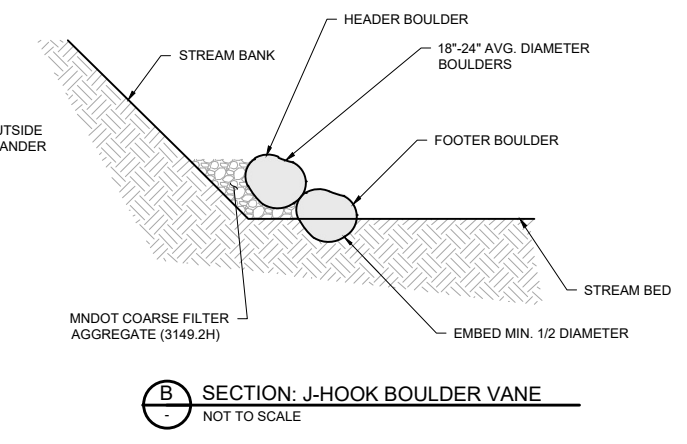
Sheet: C-39
CC2: -
File #: -



- NOTES:**
- LIVE STAKE OR CUTTING PLANTED PERPENDICULAR TO GROUND SURFACE.
 - SEE PLANT MATERIAL LIST FOR SPECIES LENGTH AND SPACING.
 - LIVE STAKES SHALL BE 3/4" DIAMETER MINIMUM. LIVE CUTTINGS SHALL BE 3/4" DIAMETER MIN.



- NOTES:**
- COARSE BACKFILL (MNDOT COARSE FILTER AGGREGATE) SHALL BE PLACED TO A THICKNESS EQUAL TO THE DEPTH OF THE HEADER AND FOOTER BOULDERS AND SHALL EXTEND OUT FORM THE VANE ARMS TO THE STREAM BANK.
 - THE VANE ARM OF THE BOULDER J-HOOK SHALL BE CONSTRUCTED FIRST, FOLLOWED BY THE HOOK.
 - BOULDER J-HOOK VANES SHALL BE BUILT TYPICALLY AS FOLLOWS:
 - OVER-EXCAVATE STREAM BED TO A DEPTH EQUAL TO THE TOTAL THICKNESS OF THE HEADER AND FOOTER BOULDERS.
 - PLACE FOOTER BOULDERS OF THE VANE ARM. THERE SHALL BE NO GAPS BETWEEN BOULDERS.
 - PLACE COARSE BACKFILL BEHIND THE FOOTER BOULDERS.
 - INSTALL HEADER BOULDERS ON THE VANE ARM ON TOP OF AND SET SLIGHTLY BACK FROM THE FOOTER BOULDERS (SUCH THAT PART OF THE HEADER BOULDER IS RESTING ON THE COARSE BACKFILL). HEADER BOULDERS SHALL SPAN THE SEAMS OF THE FOOTER BOULDERS. THERE SHALL BE NO GAPS BETWEEN BOULDERS.
 - PLACE COARSE BACKFILL BEHIND HEADER BOULDERS ENSURING THAT ANY VOIDS BETWEEN THE BOULDERS ARE FILLED.
 - PLACE EACH BOULDER TO FORM THE HOOK BY INSTALLING A FOOTER BOULDER, THEN A HEADER BOULDER. GAPS AS WIDE AS 1/4 TO 1/3 THE BOULDER DIAMETER SHALL BE LEFT BETWEEN THE HOOK BOULDERS.



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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **STREAM RESTORATION DETAILS**

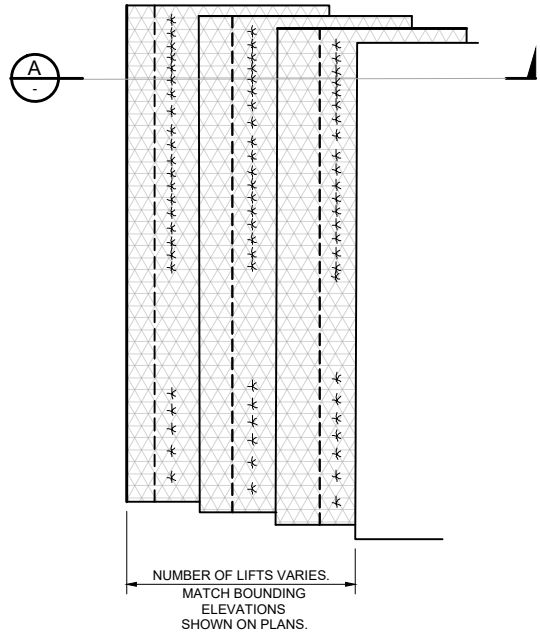
Survey: RRE 12/20
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Sheet: **D-01**

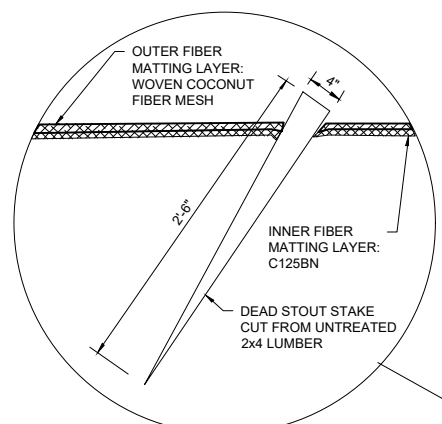
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PLAN



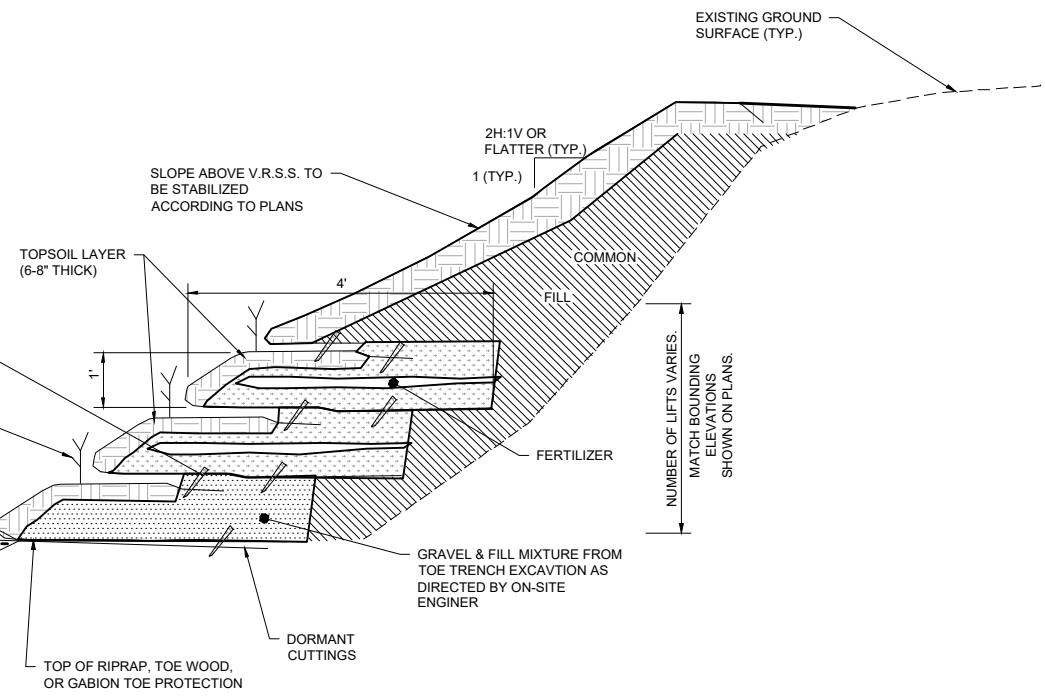
NOTES:

1. SOAK DORMANT CUTTINGS FOR A MINIMUM OF 24 HOURS IN FLOWING WATER BEFORE PLANTING. SOAKING FOR 5-7 DAYS IS CONSIDERED IDEAL. THE DORMANT CUTTINGS SHOULD ONLY BE INSTALLED DURING THE DORMANT SEASON, AFTER LEAF DROP IN THE FALL AND BEFORE BUD BREAK IN THE SPRING. DORMANT CUTTINGS STORED IN COLD STORAGE WITH NO VISIBLE SIGN OF BUD BREAK MAY BE USED INTO LATE SPRING.
2. EXCAVATE THE EXISTING STREAMBANK SLOPE SHOREWARD FROM AND LEVEL WITH THE TOP OF THE RIPRAP TO FORM A STABLE, UNDISTURBED SURFACE. A FLAT BENCH SHOULD BE CREATED FROM THE TOE OF THE STABLE CUT SLOPE TO THE TOE OF THE PROPOSED STREAM BANK TOE PROTECTION.
3. DORMANT CUTTINGS ARE TO BE PLACED ON TOP OF THE RIPRAP EXCAVATED BENCH AT 3 BRANCHES PER LINEAR FOOT; THE BASAL END OF THE CUTTINGS SHOULD EXTEND AT LEAST 2 FOOT PAST THE BACK OF THE RIPRAP. NO MORE THAN 6 INCHES OF THE BUDDING END OF THE LIVE BRANCH SHOULD EXTEND PAST THE FRONT OF THE RIPRAP. COVER THE DORMANT CUTTINGS WITH TOPSOIL TO CREATE AN EVEN SURFACE FOR THE CONSTRUCTION OF THE FIRST SOIL LIFT.
4. LAY NATURAL FIBER MATTING ON BOTTOM OF THE BENCH, OVERLAPPING ADJACENT MATTING BY 1 FOOT. THE OUTER EXPOSED FIBER MATTING LAYER OF EACH SOIL LIFT SHALL BE GEOCOIR/DEKOWE 900 WOVEN COCONUT FIBER MESH, BIOD-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.
5. THE INNER LAYER OF EACH SOIL LIFT SHALL BE BIONET C125BN OR AN ENGINEER APPROVED EQUIVALENT. LAY THE INNER LAYER OF BIONET ON TOP OF NATURAL FIBER MATTING OF EACH SOIL LIFT. FABRIC SHOULD BE INSTALLED SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. STAKE THE SHOREWARD END OF THE FIBER MATTING IN PLACE WITH WOODEN STAKES SPACED EVERY THREE FEET AS SHOWN ON THE DRAWINGS.
6. THE FIRST 6 TO 8 INCHES OF THE BOTTOM SOIL LIFT SHALL BE FILLED WITH GRAVEL AND SAND MATERIAL EXCAVATED FROM THE STREAM BED. THE TOP 8 TO 8 INCHES ON THE FRONT OF SURFACE LAYER SHOULD BE COMPRISED OF TOPSOIL MIX AS SHOWN ON THE DRAWINGS.
7. THE TOPSOIL LAYER SHALL BE SEEDED WITH THE V.R.S.S. SEED MIX AT 0.7 POUNDS PER 1,000 SQUARE FEET OF LIFT SURFACE AREA AS SHOWN ON THE DRAWINGS.
8. FOLD THE FIBER MATTING OVER THE FILL MATERIAL AND STAKE IN PLACE SO THE FABRIC IS TAUT AND SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. BACKFILL BEHIND THE BOTTOM SOIL LIFT WITH GRANULAR FILTER MATERIAL TO MEET THE EXISTING SLOPE AS SHOWN ON THE DRAWINGS.



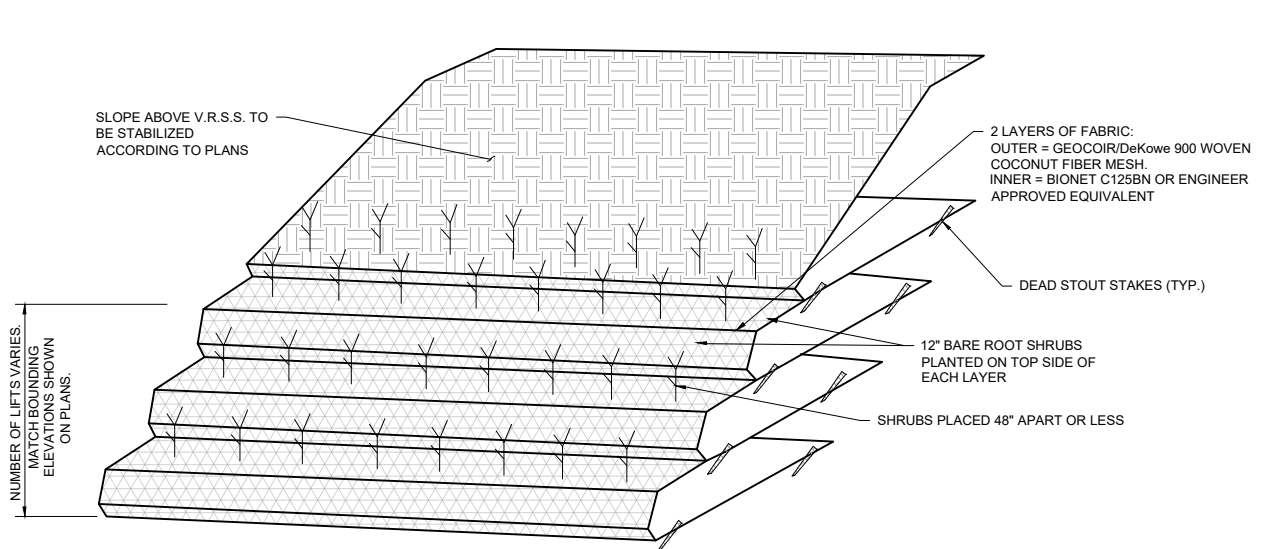
12" BARE ROOT SHRUBS SPACED APPROX. 48" APART

NORMAL WATER SURFACE LEVEL



A SECTION: CROSS-SECTION
NOT TO SCALE

ISOMETRIC



1 DETAIL: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE

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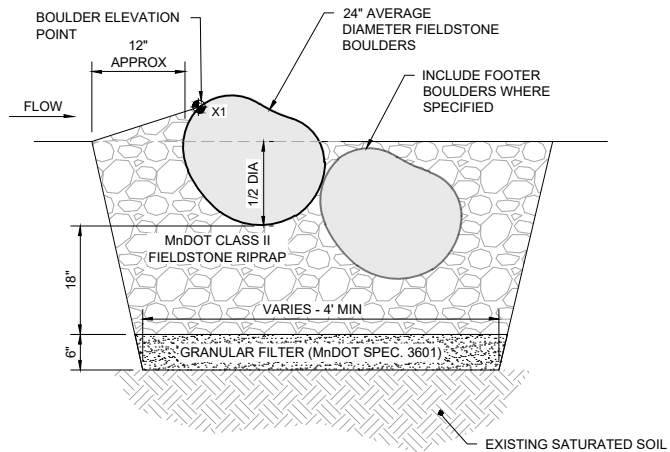
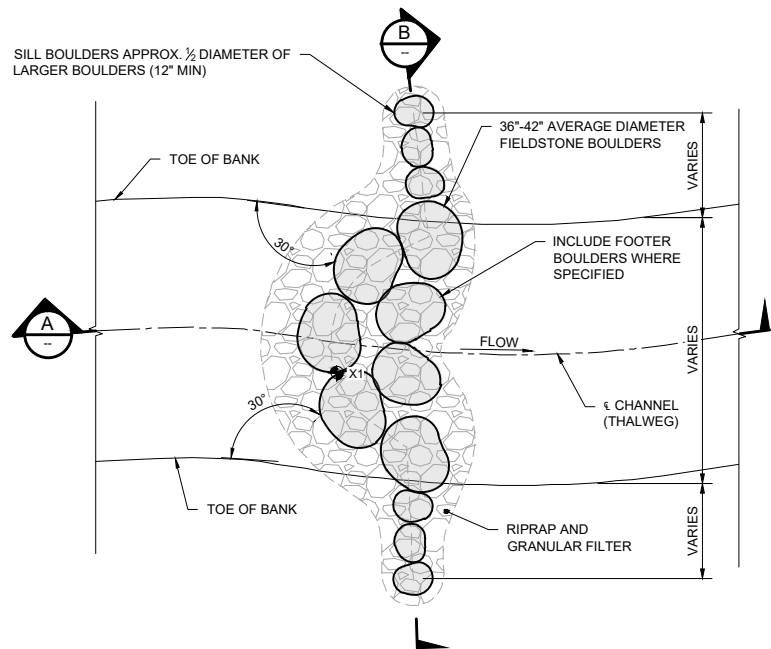
KINGSBURY CREEK RESTORATION
 Duluth, Minnesota
 DNR Division of Ecological and Water Resources
 St. Louis County (MN)
 Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **STREAM RESTORATION DETAILS**
 Survey: RRE 12/20 Designed: BARR 01/21
 Drawn: BARR 12/20 Drawn: BARR 02/21
 Checked: JCO 12/20 Checked: JCO 02/21
 Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

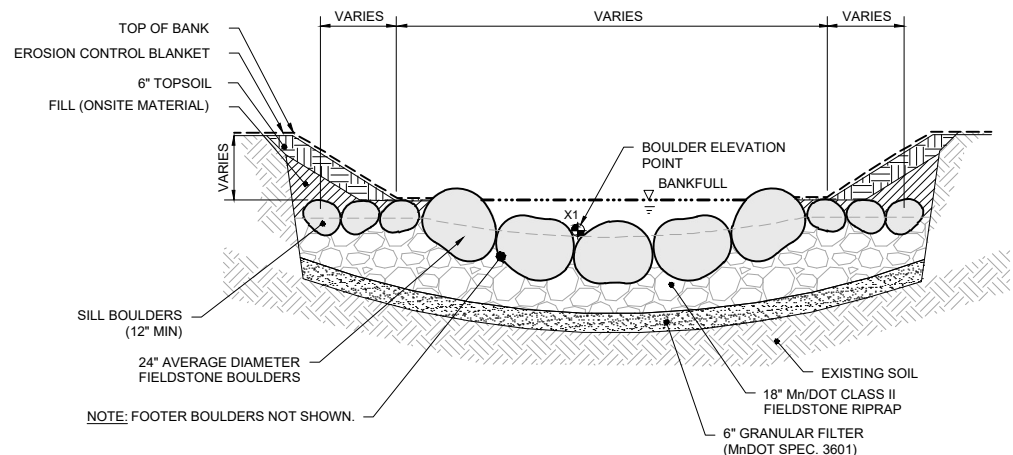
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 CC2: -
 File #: -

PLAN



A SECTION: BOULDER CROSS VANE WITH SUBGRADE STABILIZATION

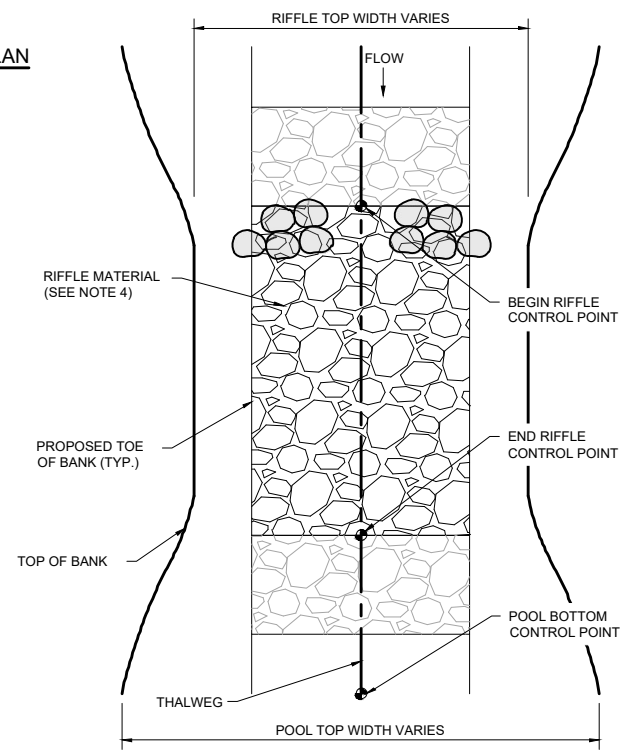
- NOTES:**
- CROSS VANE LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND MAY BE MODIFIED IN THE FIELD BY THE ENGINEER.
 - FINAL BOULDER PLACEMENT TO BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR MAY BE REQUIRED TO ADJUST BOULDER ELEVATIONS AND ROTATION.
 - THERE SHALL BE NO SIGNIFICANT GAPS BETWEEN BOULDERS. RIPRAP BEDDING SHALL BE PLACED ON THE UPSTREAM SIDE OF THE BOULDERS TO PLUG SMALL GAPS (MAY REQUIRE HAND PLACEMENT).
 - BOULDERS OF AN UNSUITABLE SHAPE MAY BE RE-LOCATED OR REJECTED.
 - INSTALL EROSION CONTROL BLANKET ON DISTURBED BANKS.



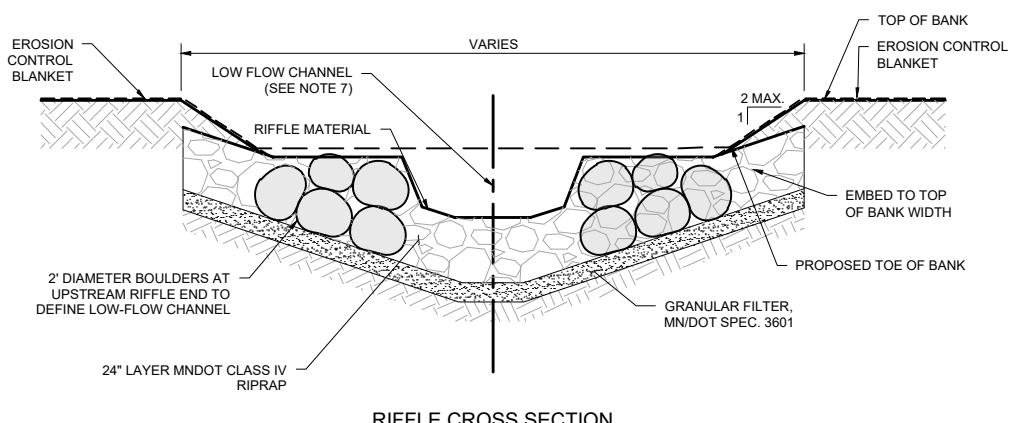
B SECTION: BOULDER CROSS VANE WITH SUBGRADE STABILIZATION

1 DETAIL: CROSS VANE - DOUBLE BOULDER WITH SUBGRADE STABILIZATION
NOT TO SCALE

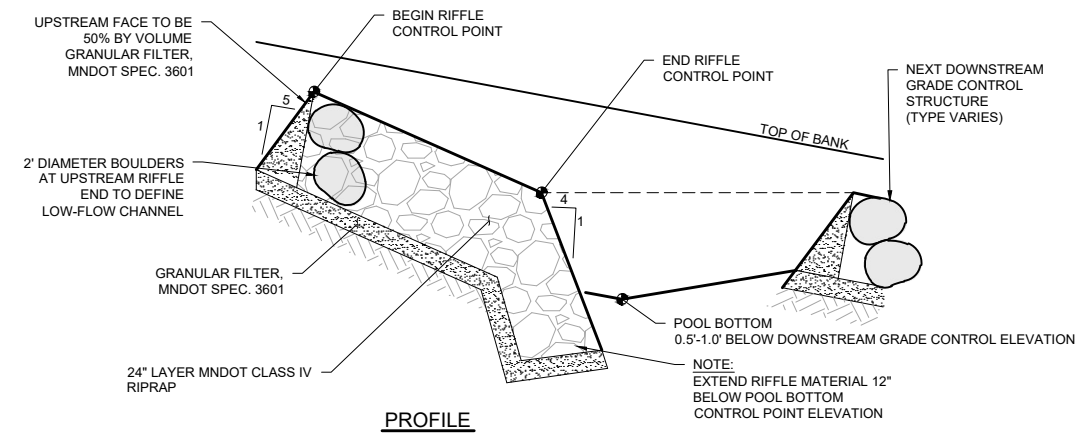
PLAN



- NOTES:**
- CONSTRUCTED RIFFLES SHALL BE INSTALLED IN NEWLY GRADED CHANNEL SECTION.
 - ELEVATION CONTROL POINTS SHALL BE DESIGNATED AT THE BEGINNING AND END OF RIFFLE POINTS TO ESTABLISH PART OF THE PROFILE OF THE CHANNEL. SURVEY OF CONTROL POINTS SHALL BE REQUIRED TO ESTABLISH ACCURATE RIFFLE INSTALLATION.
 - RIFFLE MATERIAL SHALL BE OF A TYPE, SIZE, AND GRADATION AS SPECIFIED. (SEE TABLE)
 - THE FACE OF THE RIFFLE UPSTREAM OF THE BEGIN RIFFLE CONTROL POINT SHALL BE 50% BY VOLUME GRANULAR FILTER AGGREGATE (MNDOT SPEC 3601) TO REDUCE VOID SPACES. FILTER AGGREGATE SHALL BE INCIDENTAL TO THE RIFFLE MATERIAL.
 - THE PLACEMENT OF BACKFILL AND/OR RIFFLE MATERIAL SHALL BE DONE IN A MANNER TO CREATE A SMOOTH PROFILE, WITH NO ABRUPT 'JUMP' (TRANSITION) BETWEEN THE UPSTREAM POOL-GLIDE AND THE RIFFLE, AND LIKEWISE NO ABRUPT 'DROP' (TRANSITION) BETWEEN THE RIFFLE AND THE DOWNSTREAM RUN-POOL. ALSO A THALWEG SHALL BE FASHIONED WITHIN THE RIFFLE WIDTH SO THAT THE FINISHED CROSS SECTION OF THE RIFFLE MATERIAL MATCHES THE SHAPE AND DIMENSIONS SHOWN ON THE RIFFLE TYPICAL SECTION.
 - SEE THE STREAM RESTORATION STRUCTURES TABLES FOR STATIONING AND ELEVATIONS.
 - SEE RIFFLE TYPICAL SECTION FOR BANKFULL AND LOW-FLOW CHANNEL DIMENSIONS.



RIFFLE CROSS SECTION



PROFILE

2 DETAIL: ROCK RIFFLE
NOT TO SCALE

ISSUED FOR BID
95% DESIGN
NOT FOR CONSTRUCTION



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I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly licensed professional engineer under the laws of the state of Minnesota.
Name: **JESSICA C. OLSON** License #: 43102
Date: -

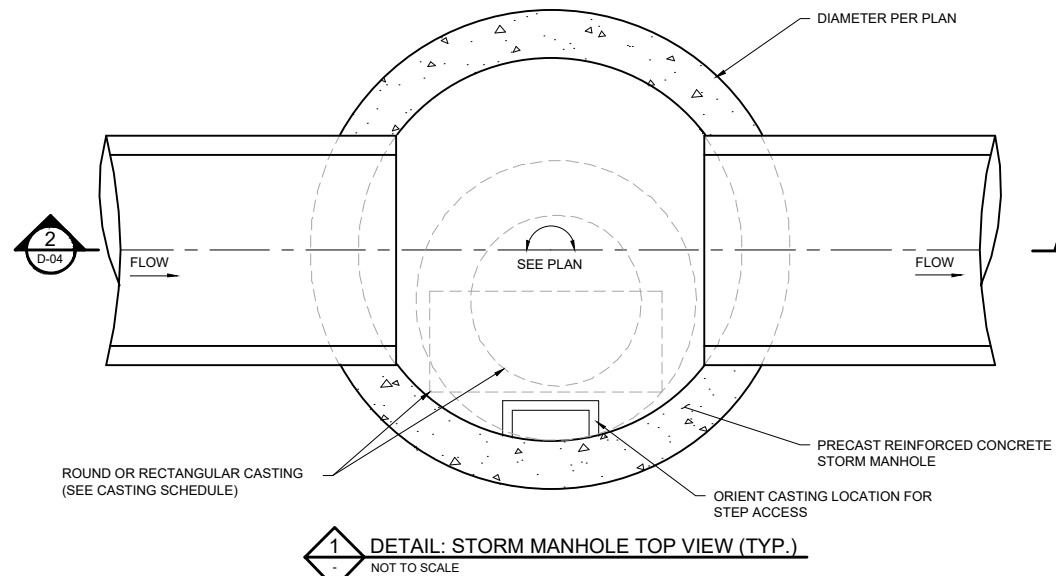
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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

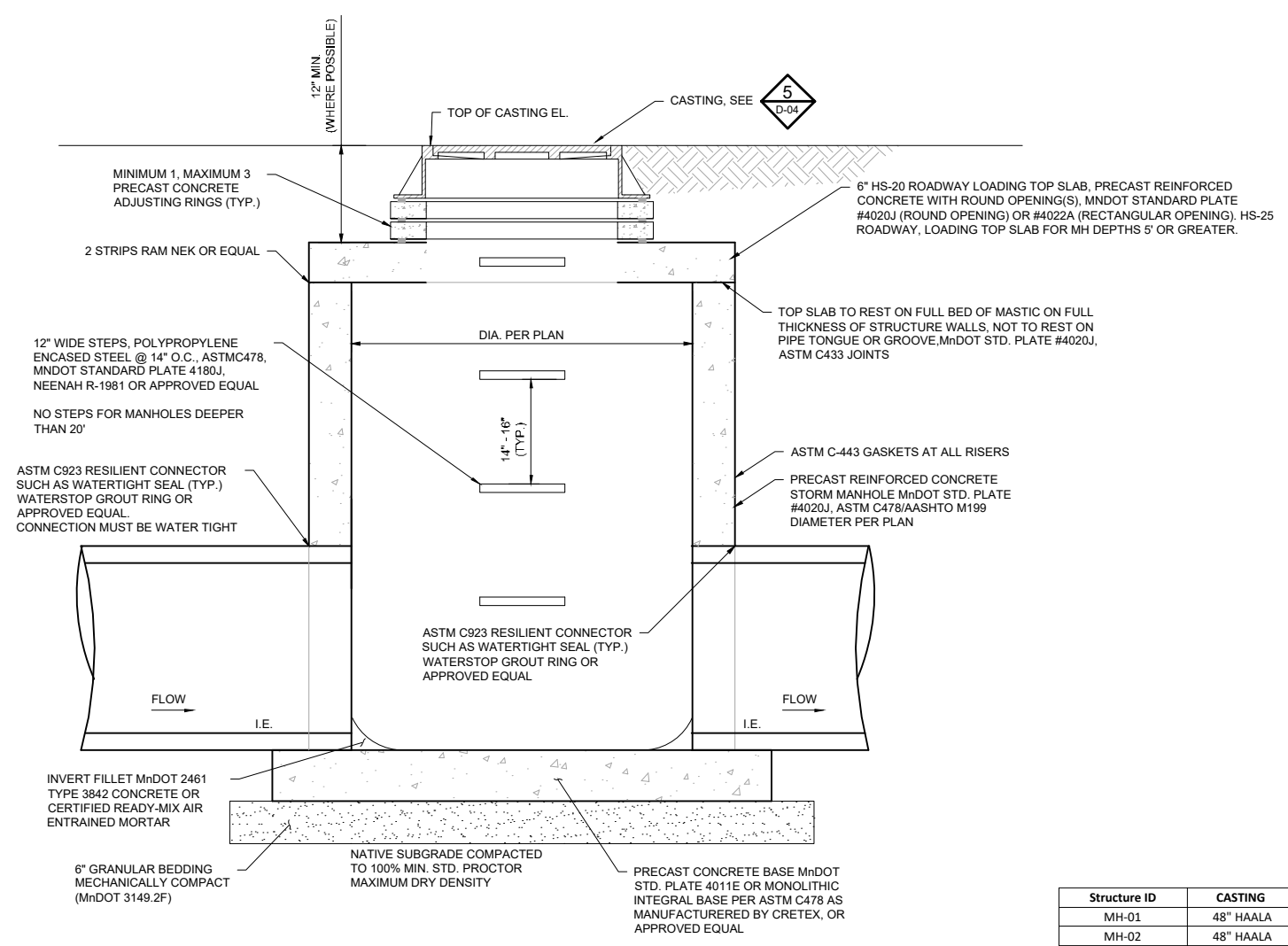
Revisions	
Date	By

Title: STREAM RESTORATION DETAILS	
Survey: RRE 12/20	Designed: BARR 01/21
Drawn: BARR 12/20	Drawn: BARR 02/21
Checked: JCO 12/20	Checked: JCO 02/21
Horz. datum: St. Louis Co. Coord.	Vert. datum: NAVD88

Sheet: D-03
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File #: -



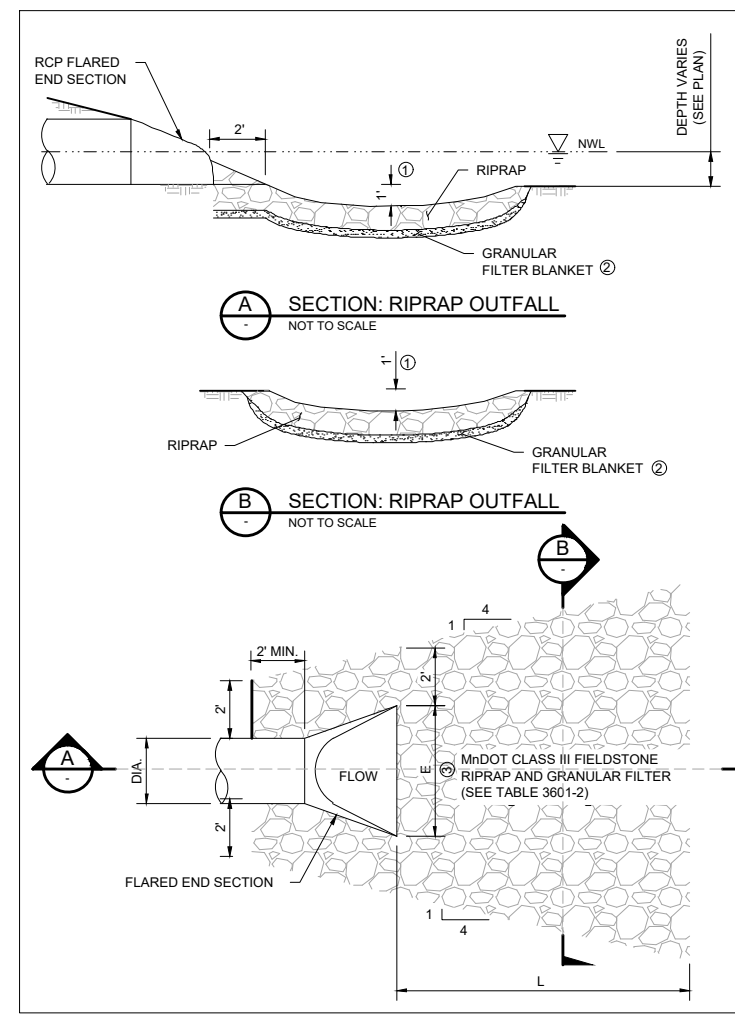
1 DETAIL: STORM MANHOLE TOP VIEW (TYP.)
NOT TO SCALE



2 SECTION: STORM MANHOLE SIDE VIEW (TYP.)
NOT TO SCALE

5 DETAIL: STRUCTURE TABLE
N/A

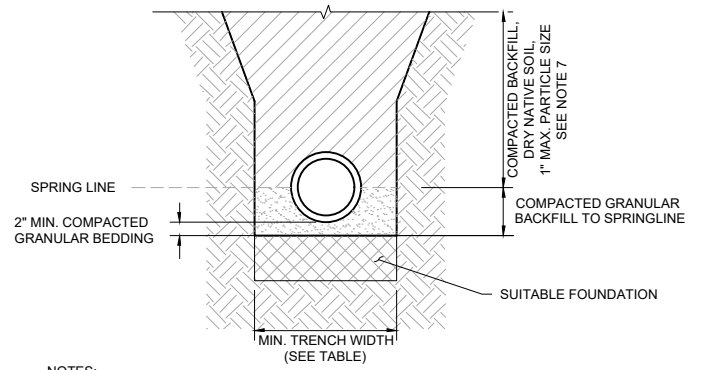
Structure ID	CASTING
MH-01	48" HAALA
MH-02	48" HAALA



A SECTION: RIPRAP OUTFALL
NOT TO SCALE

B SECTION: RIPRAP OUTFALL
NOT TO SCALE

3 DETAIL: RIPRAP APRON
NOT TO SCALE



4 DETAIL: PIPE TRENCH
NOT TO SCALE

- NOTES:
- GRANULAR BEDDING PER MnDOT STANDARD SPECIFICATION 3149.2.J.2 FINE FILTER AGGREGATE.
 - MEASURES SHOULD BE TAKEN TO PREVENT MIGRATION OF NATIVE FINES INTO BACKFILL MATERIAL, WHEN REQUIRED.
 - FOUNDATION: WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH SUITABLE MATERIAL AS SPECIFIED BY THE ENGINEER. AS AN ALTERNATIVE AND AT THE DISCRETION OF THE DESIGN ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A GEOTEXTILE MATERIAL.
 - MINIMUM COVER: MINIMUM COVER IN NON-TRAFFIC APPLICATIONS (GRASS OR LANDSCAPE AREAS) IS 12" FROM THE TOP OF PIPE TO GROUND SURFACE.
 - MAINTAIN A DRY TRENCH WHEN BACKFILLING AROUND THE PIPE. COMPACT TO 95% STANDARD PROCTOR.
 - NO RUBBER Tired VEHICLES ALLOWED OVER INSTALLED CPEP PIPES UNTIL A MINIMUM OF 18" OF COVER IS PLACED.
 - COMPACTED BACKFILL SHALL MEET SPECIFICATION REQUIREMENTS OF ONSITE FILL.

TABLE OF QUANTITIES RIPRAP AT PIPE OUTFALLS							
DIA. OF ROUND PIPE (IN.)	L (FT.)	CLASS II d50 = 6"		CLASS III d50 = 9"		CLASS IV d50 = 12"	
		12" DEPTH RIPRAP (CU. YD.)	6" DEPTH GRANULAR FILTER (CU. YD.)	18" DEPTH RIPRAP (CU. YD.)	9" DEPTH GRANULAR FILTER (CU. YD.)	24" DEPTH RIPRAP (CU. YD.)	12" DEPTH GRANULAR FILTER (CU. YD.)
12	8	2.8	1.4	4.1	2.1	5.5	2.8
15	8	2.9	1.5	4.4	2.2	5.8	2.9
18	10	3.9	2.0	5.9	3.0	7.8	3.9
21	10	4.2	2.1	6.3	3.3	8.4	4.2
24	12	5.5	2.8	8.3	4.2	11.0	5.5
27	12	5.8	2.9	8.7	4.4	11.6	5.8
30	14	7.3	3.7	10.9	5.5	14.5	7.3
36	16	9.2	4.6	13.8	6.9	18.3	9.2
42	18	10.9	5.5	16.3	8.2	21.7	10.9
48	20	12.9	6.5	19.4	9.7	25.8	12.9

- NOTES:
- PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A SPECIAL DESIGN.
- REQUIREMENTS FOR RIPRAP SIZE AND THICKNESS AND FILTER BLANKET SHALL BE DESIGNATED IN THE PLANS.
- FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5'.
 - THE CONTRACTOR, AT HIS OPTION, MAY SUBSTITUTE A GEOTEXTILE FABRIC, SPEC. 3733, FOR THE GRANULAR FILTER BLANKET UNLESS OTHERWISE SPECIFIED IN THE PLANS. THE FABRIC SHOULD COVER THE AREA OF THE RIPRAP AND EXTEND UNDER THE CULVERT APRON 3 FT.
 - DIMENSION E IS GIVEN ON STANDARD PLATES 3100 AND 3110.

PIPE DIAM. INCHES	MIN. TRENCH WIDTH INCHES
12	30
15	34
18	39
24	48
30	56
36	64
42	72
48	80

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I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly licensed professional engineer under the laws of the state of Minnesota.

Name: JESSICA C. OLSON License #: 43102

Date: -

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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: UTILITY DETAILS

Survey: RRE 12/20
Drawn: BARR 12/20
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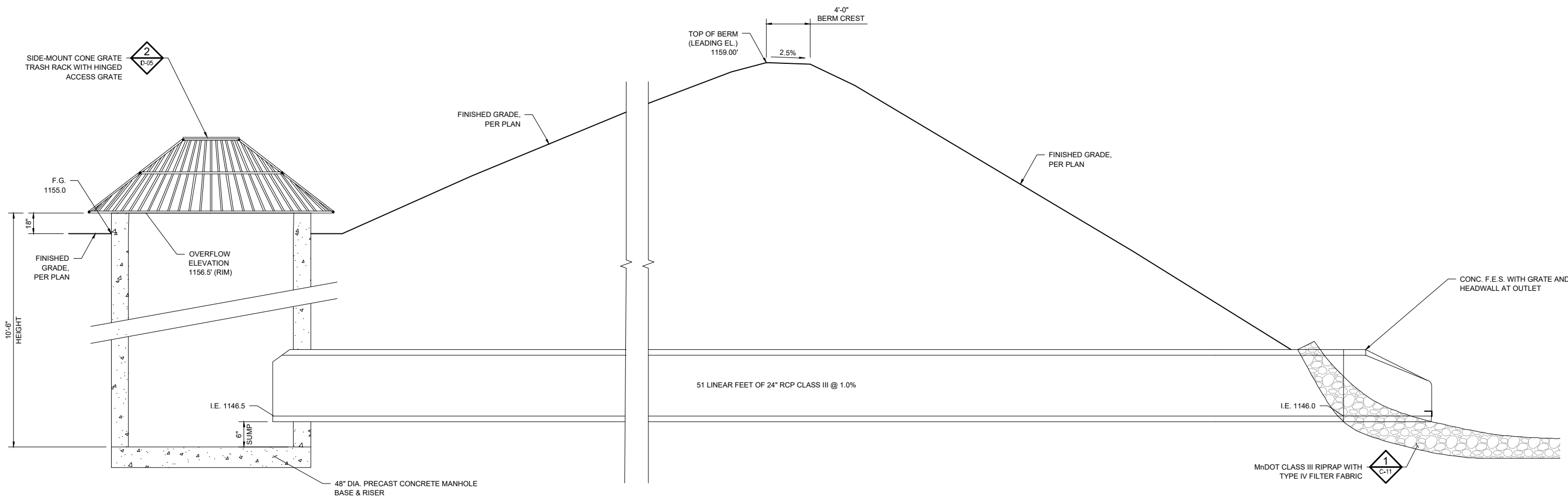
Designed: BARR 01/21
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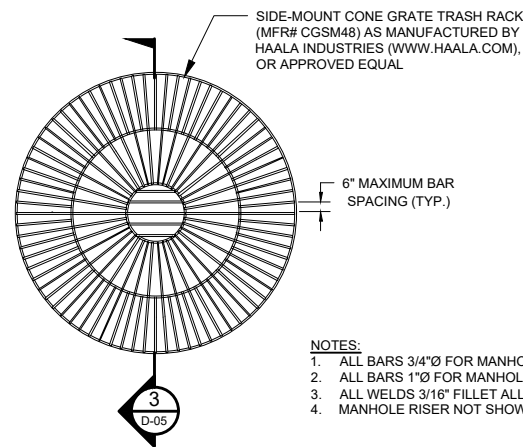
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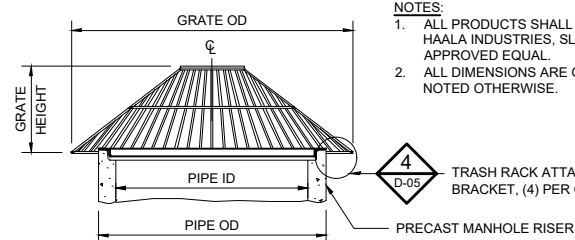
1 SECTION: OVERFLOW MANHOLE AND GRATE STRUCTURE AT BERM
NOT TO SCALE



- NOTES:
1. ALL BARS 3/4"Ø FOR MANHOLE PIPE ID 96" OR LESS.
 2. ALL BARS 1"Ø FOR MANHOLE PIPE ID 108" AND 120".
 3. ALL WELDS 3/16" FILLET ALL AROUND.
 4. MANHOLE RISER NOT SHOWN FOR CLARITY.

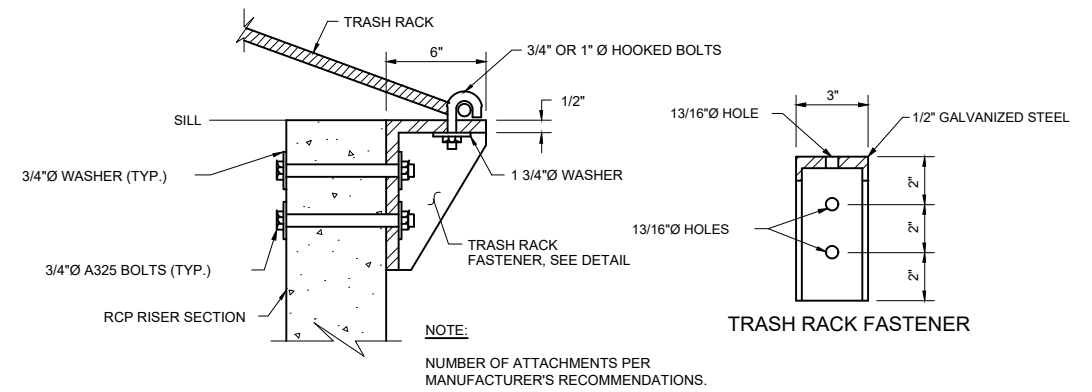
2 DETAIL: SPECIAL INLET TRASH RACK, CONE GRATE SIDE MOUNT
NOT TO SCALE

PIPE ID	PIPE OD	GRATE OD	GRATE HEIGHT
48	58	70	12



- NOTES:
1. ALL PRODUCTS SHALL BE MANUFACTURED BY HAALA INDUSTRIES, SLEEPY EYE, MN, OR APPROVED EQUAL.
 2. ALL DIMENSIONS ARE GIVEN IN INCHES UNLESS NOTED OTHERWISE.

3 SECTION: SPECIAL INLET TRASH RACK, CONE GRATE SIDE MOUNT
NOT TO SCALE



4 DETAIL: SPECIAL INLET TRASH RACK FASTENER ATTACHMENT
SCALE IN INCHES

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Name: JESSICA C. L. OLSON License #: 43102
Date: -

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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
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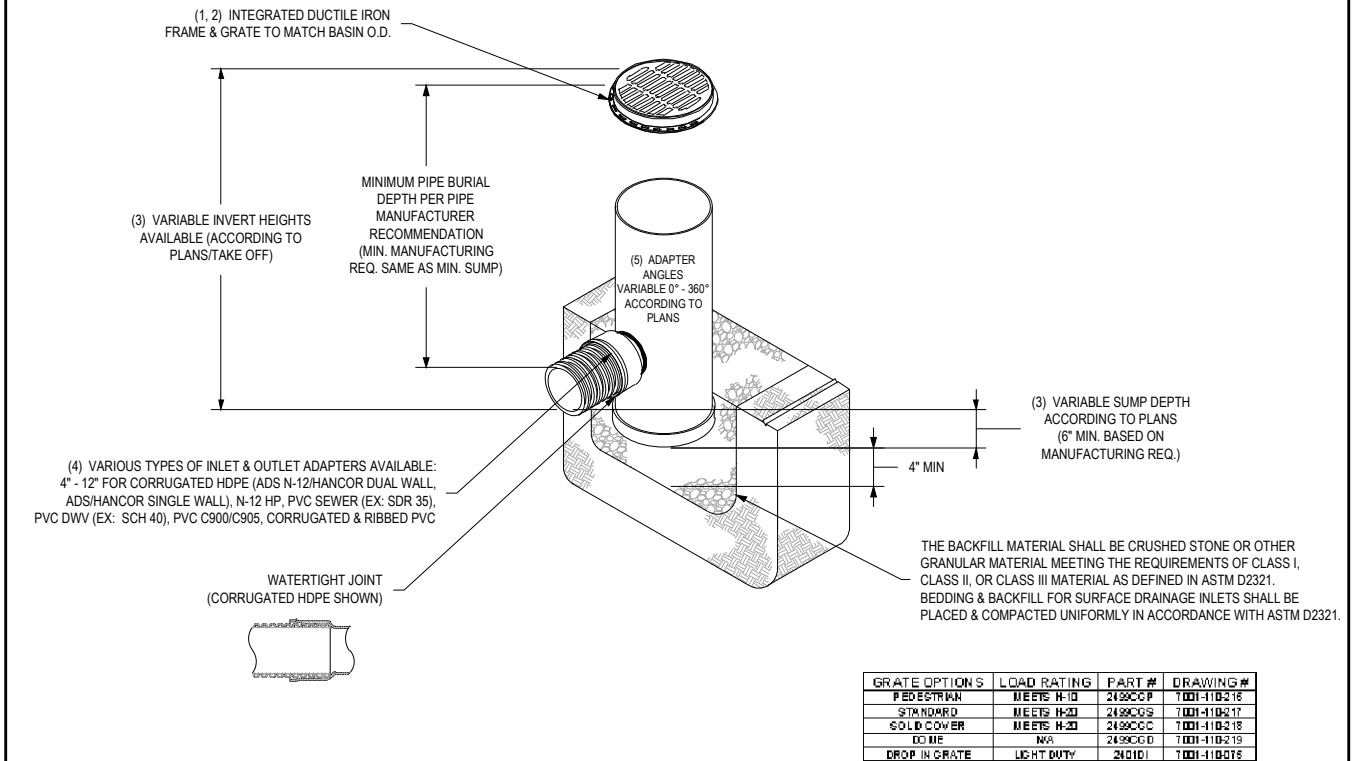
Revisions	
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Sheet: **D-05**
CC2: -
File #: -

NYLOPLAST 12" DRAIN BASIN: 2812AG _X



GRATE OPTION S	LOAD RATING	PART #	DRAWING #
PEDESTRIAN	MEETS H-10	249CCP	T001-110-216
STANDARD	MEETS H-20	249CCS	T001-110-217
SOLID COVER	MEETS H-20	249CCG	T001-110-218
EG ME	N/A	249CCGD	T001-110-219
DROP IN GRATE	LIGHT DUTY	249D	T001-110-215

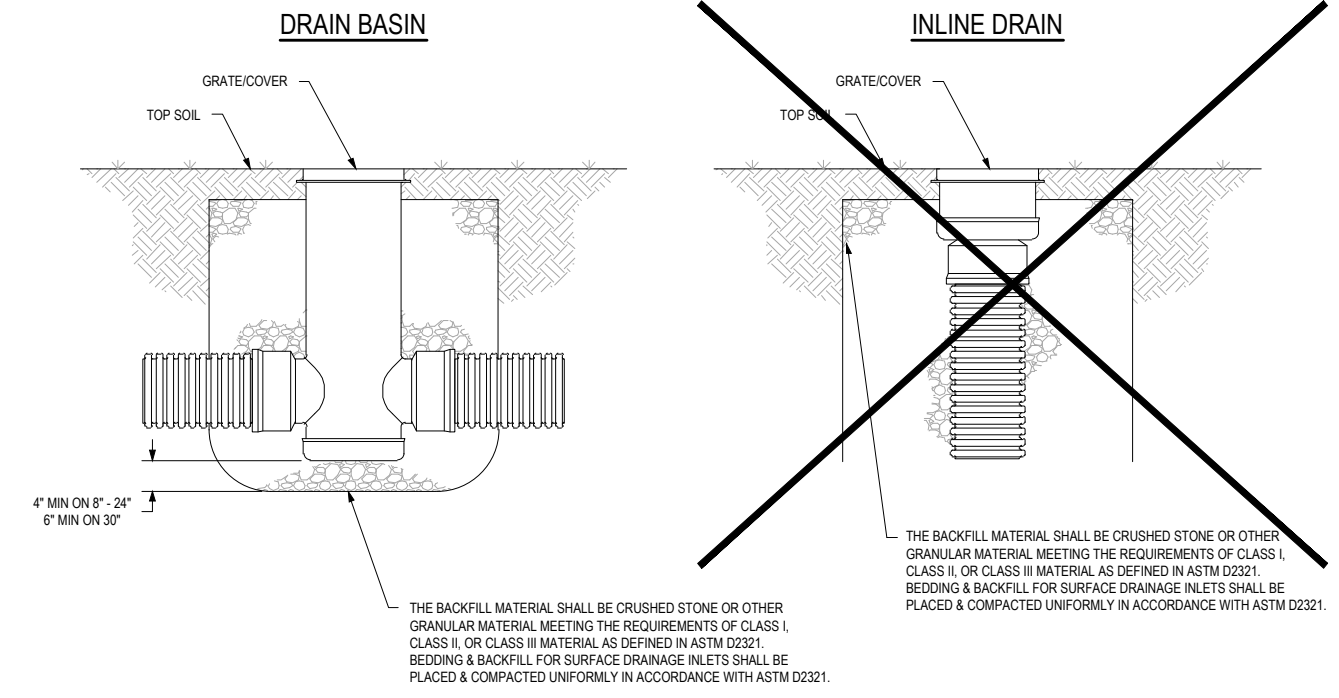
- 1 - GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
- 2 - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
- 3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.
- 4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP & PVC SEWER.
- 5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

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DRAWN BY: EBC	MATERIAL:	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
DATE: 04-03-06	PROJECT NO./NAME:	
REVISED BY: NMH	TITLE:	24 IN DRAIN BASIN QUICK SPEC INSTALLATION DETAIL
DATE: 03-14-16	DWG NO.:	7001-110-192
DWG SIZE: A	SCALE: 1:40	SHEET: 1 OF 1
	REV: E	

1 DETAIL: NYLOPLAST CATCH BASIN
NOT TO SCALE

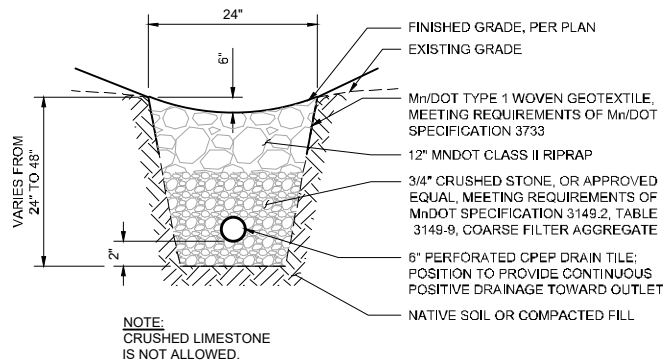
NON TRAFFIC INSTALLATION



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DATE: 9-30-99	PROJECT NO./NAME:	
REVISED BY: NMH	TITLE:	DRAIN BASIN & INLINE DRAIN NON TRAFFIC INSTALLATION
DATE: 03-11-16	DWG NO.:	7001-110-111
DWG SIZE: A	SCALE: 1:25	SHEET: 1 OF 1
	REV: E	

2 DETAIL: CATCH BASIN NON-TRAFFIC INSTALLATION
NOT TO SCALE



3 SECTION: DRAIN TILE TYPICAL
NOT TO SCALE

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Date: -

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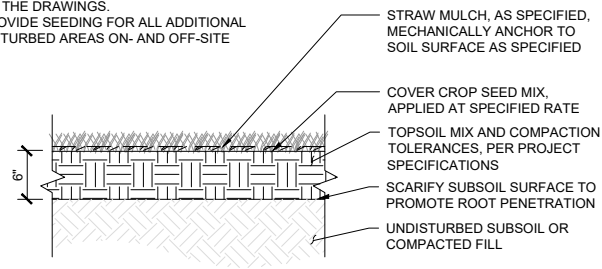
KINGSBURY CREEK RESTORATION
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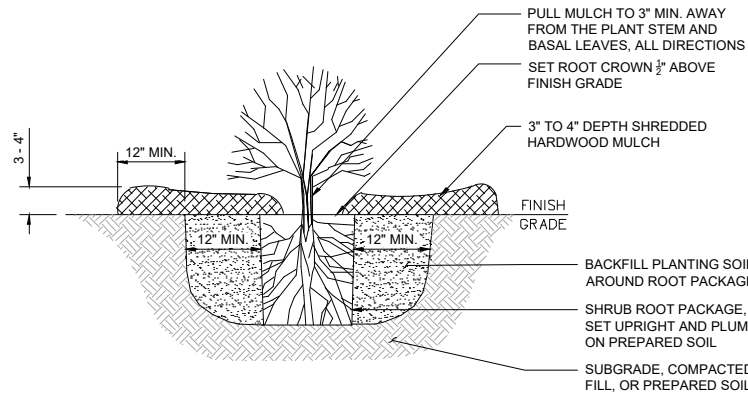
Sheet: D-06
CC2: -
File #: -

- NOTES:**
1. PREPARE SOIL PER PLAN AND AS SPECIFIED.
 2. PROVIDE SEEDING FOR ALL AREAS NOTED ON THE DRAWINGS.
 3. PROVIDE SEEDING FOR ALL ADDITIONAL DISTURBED AREAS ON- AND OFF-SITE



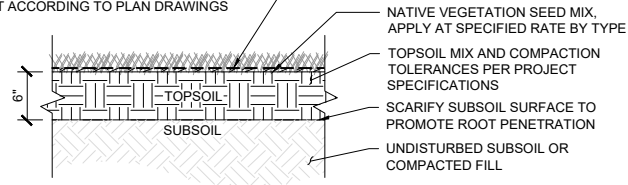
1 DETAIL: TEMPORARY COVER SEEDING
NOT TO SCALE

- NOTES:**
1. PREPARE PLANTING SOIL PER PLAN.
 2. PROVIDE AND INSTALL PLANTS PER SCHEDULE.
 3. REMOVE DEAD OR DAMAGED BRANCHES. RETAIN THE NATURAL FORM OF PLANT.
 4. DIG PLANT HOLES 18" MIN. LARGER THAN ROOT PACKAGE, ALL SIDES.
 5. SET SHRUB ON LIGHTLY FIRMED BACKFILL SOIL TO ALLOW THE NURSERY-GROWN TOP OF ROOT PACKAGE/ ROOT CROWN TO BE 1/2" ABOVE FINISH GRADE.
 6. BACKFILL WITH PLANTING SOIL FIRM SOIL AROUND ROOT PACKAGE TO MAINTAIN PLUMB AND ENSURE NO AIR GAPS.
 7. CONSTRUCT 3"D WATERING BASIN. WATER THOROUGHLY WITHIN 3 HOURS OF INSTALLATION.
 8. APPLY MULCH PER TO ENTIRE PLANTING AREA (SOIL PREPARED AS PER PLAN AND AS SPECIFIED).
 9. REMOVE MULCH FROM AROUND THE PLANT AT BASE POST-INSTALLATION. NO MULCH TO BE IN CONTACT WITH PLANT.
 10. WATER THOROUGHLY AFTER PLANTING AND AS SPECIFIED FOR THE DURATION OF THE WARRANTY MAINTENANCE PERIOD.



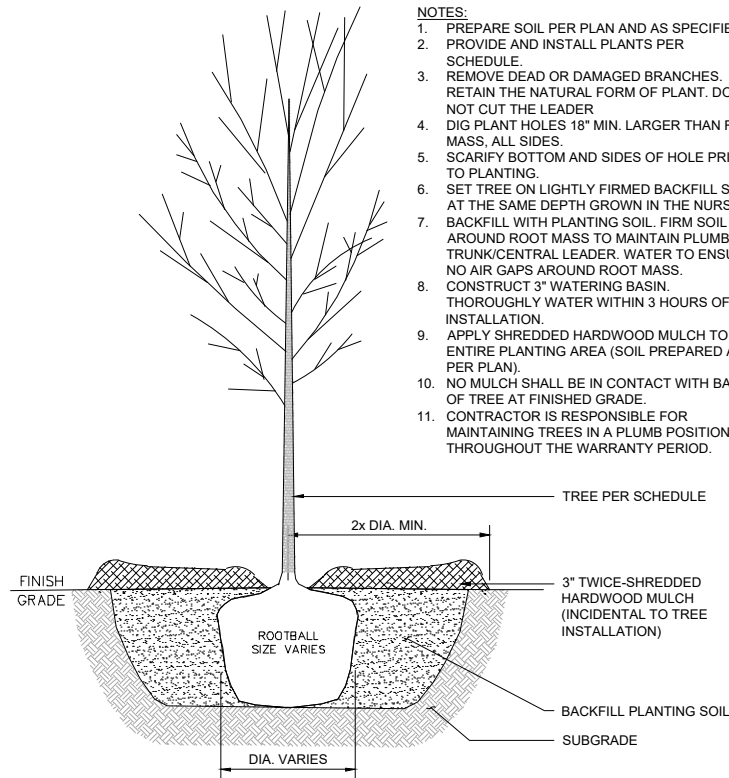
3 DETAIL: CONTAINER-GROWN SHRUB PLANTING
NOT TO SCALE

- NOTES:**
1. PREPARE SOIL PER PLAN AND AS SPECIFIED.
 2. PROVIDE SEEDING FOR ALL AREAS NOTED ON THE DRAWINGS.
 3. PROVIDE PERMANENT SEEDING FOR FINAL STABILIZATION OF ALL DISTURBED AREAS ON- AND OFF-SITE.
 4. SEE ALSO RESTORATION SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
 5. WHERE REQUIRED, PLANT PLUGS OR OTHER PLANT ACCORDING TO PLAN DRAWINGS



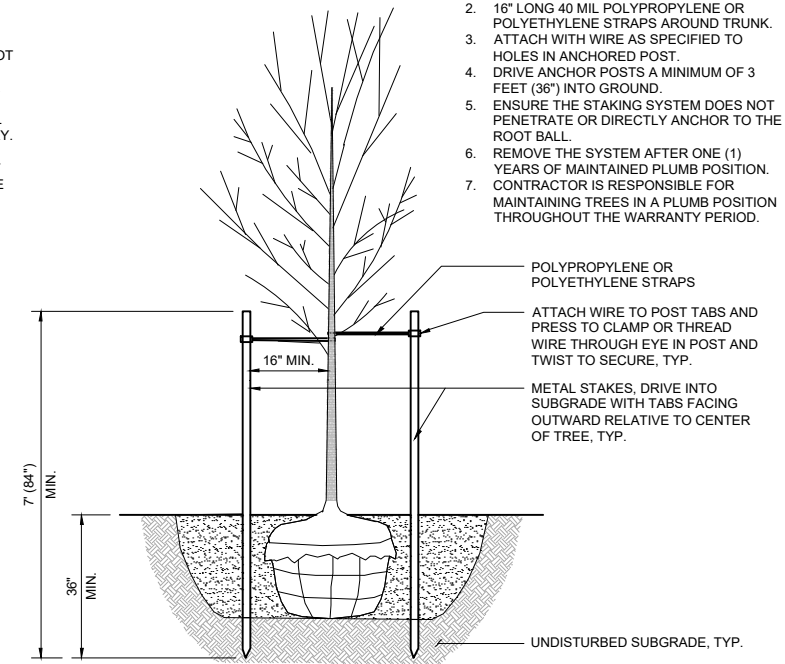
2 DETAIL: PERMANENT SEEDING AND MULCHING
NOT TO SCALE

- NOTES:**
1. PREPARE SOIL PER PLAN AND AS SPECIFIED.
 2. PROVIDE AND INSTALL PLANTS PER SCHEDULE.
 3. REMOVE DEAD OR DAMAGED BRANCHES. RETAIN THE NATURAL FORM OF PLANT. DO NOT CUT THE LEADER
 4. DIG PLANT HOLES 18" MIN. LARGER THAN ROOT MASS, ALL SIDES.
 5. SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.
 6. SET TREE ON LIGHTLY FIRMED BACKFILL SOIL AT THE SAME DEPTH GROWN IN THE NURSERY.
 7. BACKFILL WITH PLANTING SOIL. FIRM SOIL AROUND ROOT MASS TO MAINTAIN PLUMB AT TRUNK/CENTRAL LEADER. WATER TO ENSURE NO AIR GAPS AROUND ROOT MASS.
 8. CONSTRUCT 3" WATERING BASIN. THOROUGHLY WATER WITHIN 3 HOURS OF INSTALLATION.
 9. APPLY SHREDDED HARDWOOD MULCH TO ENTIRE PLANTING AREA (SOIL PREPARED AS PER PLAN).
 10. NO MULCH SHALL BE IN CONTACT WITH BASE OF TREE AT FINISHED GRADE.
 11. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TREES IN A PLUMB POSITION THROUGHOUT THE WARRANTY PERIOD.



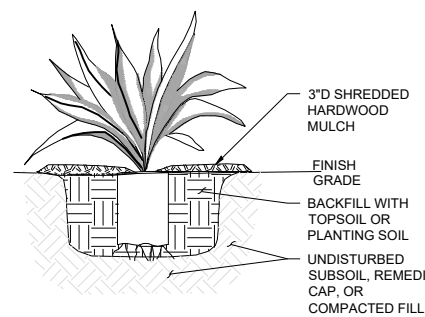
4 DETAIL: B&B TREE PLANTING
NOT TO SCALE

- NOTES:**
1. ALL TREES SHALL BE STAKED AND GUYED TO MAINTAIN VERTICALITY FOLLOWING PLANTING.
 2. 16" LONG 40 MIL. POLYPROPYLENE OR POLYETHYLENE STRAPS AROUND TRUNK.
 3. ATTACH WITH WIRE AS SPECIFIED TO HOLES IN ANCHORED POST.
 4. DRIVE ANCHOR POSTS A MINIMUM OF 3 FEET (36") INTO GROUND.
 5. ENSURE THE STAKING SYSTEM DOES NOT PENETRATE OR DIRECTLY ANCHOR TO THE ROOT BALL.
 6. REMOVE THE SYSTEM AFTER ONE (1) YEARS OF MAINTAINED PLUMB POSITION.
 7. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TREES IN A PLUMB POSITION THROUGHOUT THE WARRANTY PERIOD.



5 DETAIL: TREE STAKING AND GUYING
NOT TO SCALE

- NOTES:**
1. EXCAVATE HOLE 3 TIMES WIDTH OF ROOTBALL.
 2. BREAK BOTTOM OF ROOTBALL TO LOOSEN ROOTS.
 3. PLANT THROUGH MULCH AND ECB OPENING, ALIGNING TOP OF ROOTBALL EVEN WITH SOIL FINISH GRADE. FIRM SOIL TO ENSURE GOOD CONTACT WITH ROOTS.
 4. WATER THOROUGHLY AFTER PLANTING.
 5. SEE SPECIFICATIONS FOR FURTHER INSTRUCTION REGARDING PLANTING LAYOUT AND PROCEDURES.
 6. SEE ALSO SEEDING AND PLANTING NOTES



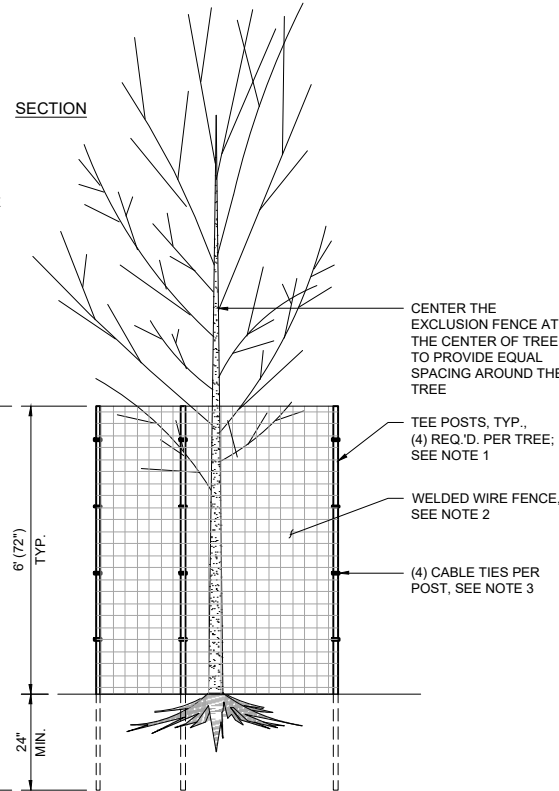
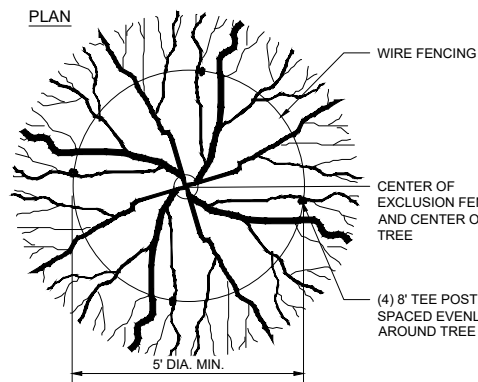
7 DETAIL: HERBACEOUS PLUG PLANTING
NOT TO SCALE

SITE RESTORATION NOTES:

1. FINAL LOCATIONS OF BEST MANAGEMENT PRACTICES (BMPs) ARE SUBJECT TO CHANGE DEPENDING OF FIELD CONDITIONS. IF THE LOCATION OF THE BMPs DIFFER FROM WHAT IS SHOWN ON THE DRAWING, THE EROSION CONTROL PLAN WILL BE AMENDED TO INCLUDE THE EXACT BMP LOCATION.
2. EXPOSED SOILS SHALL BE STABILIZED WITHIN 7 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS CEASED.
3. REFER TO THE EROSION CONTROL PLAN AND PROJECT SPECIFICATIONS FOR BMP INSPECTION AND MAINTENANCE REQUIREMENTS.
4. POTENTIAL POLLUTANTS AND ASSOCIATED ACTIVITIES, SUCH AS PORTABLE TOILETS, CONSTRUCTION MATERIALS, VEHICLE FUELING AND MAINTENANCE, ETC. SHALL BE STORED/OCCUR AT THE TEMPORARY LAYDOWN AREAS AS SHOWN ON CIVIL DRAWINGS. MANAGEMENT OF THESE AREAS SHALL BE AS DIRECTED BY THE PROJECT SPECIFICATIONS.
5. REFER TO PROJECT SPECIFICATIONS FOR ALL RESTORATION REQUIREMENTS.
6. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL UTILITIES.
7. RESTORE ALL DISTURBED AREAS WITH SEED AND MULCH PER DTL 2/R-01 AND AS SPECIFIED. PROVIDE MULCH COVER OVER ALL EXPOSED AREAS NOT COVERED IN EROSION CONTROL BLANKET OR FINISHED WITH GRAVEL, RIPRAP, OR OTHER HARD SURFACING.

SEEDING REQUIREMENTS:

1. SEEDING SHALL BE PERFORMED IN ACCORDANCE WITH MN/DOT STANDARDS AND PER PROJECT SPECIFICATIONS.
2. FOR ALL RIPARIAN DISTURBANCE AND V.R.S.S. AREAS LOCATED ON SLOPES AT- OR BELOW NORMAL WATER LEVEL, SEED WITH TYPE A SEED MIX AT RATE AS SPECIFIED.
3. FOR ALL UPLAND DISTURBANCE AND V.R.S.S. AREAS IN PART SHADE, SEED WITH TYPE B SEED MIX AT RATE SPECIFIED.
4. ALL PERMANENT SEEDING MUST BE CONSTRUCTED PER DTL 2/R-01 AND AS SPECIFIED.



- NOTES:**
1. INSTALL 8'-0" (96") T-POST TO EMBED A MINIMUM OF 24" INTO THE GROUND. PROVIDE (4) POSTS SPACED EVENLY AROUND EACH TREE.
 2. FENCE FABRIC SHALL BE 6' (72") TALL 14-GA WELDED WIRE FENCE WITH 2"x4" OPENINGS.
 3. TIE FENCE FABRIC TO EACH POST WITH (4) EXTREME WEATHER RATED NON- PHOTODEGRADABLE CABLE TIES. (0.15" WIDE UV-WEATHER RESISTANT ZIP STRIPS).
 4. FENCING SHALL PROVIDE ENOUGH SPACE AROUND TREE SO AS TO ALLOW FOR GROWTH OF BRANCHES WHILE STILL REMAINING WITHIN ENCLOSURE.
 5. OVERLAP FENCE FABRIC 4" MIN. AT END AND IN ALL DIRECTIONS.
 6. ENSURE THE FENCE POSTS DO NOT PENETRATE OR DIRECTLY ANCHOR TO THE ROOT BALL.
 7. ENSURE THERE ARE NO GAPS BETWEEN THE BOTTOM OF FENCE AND FINISHED GRADE TO PREVENT RODENT INTRUSION.
 8. REMOVE THE SYSTEM AFTER THREE (2) YEARS OF MAINTAINED EXCLUSION.
 9. SEE OTHER DETAILS FOR FURTHER INFORMATION ON TREE PLANTING
 10. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE FENCING THROUGHOUT THE WARRANTY PERIOD.

6 DETAIL: WILDLIFE EXCLUSION FENCING
SCALE IN FEET



I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota.

Name: ANDREA M. WEDUL License #: 52234
Date: -

Operations Services
Safety
Facilities
Materials
Equipment
Field Operations
Information Management

KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions	
Date	By

Title: **SITE RESTORATION DETAILS**

Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 01/21
Checked: JCO 12/20 Checked: AMW 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

Sheet: **R-01**
CC2: -
File #: -

ISSUED FOR BID
NOT FOR CONSTRUCTION

36-311 WOODLAND EDGE NORTHEAST				
Common Name	Scientific Name	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
Fringed brome	<i>Bromus ciliatus</i>	2.00	5.98%	8.10
Slender wheatgrass	<i>Elymus trachycaulus</i>	2.00	5.96%	5.06
Nodding wild rye	<i>Elymus canadensis</i>	1.25	3.72%	2.38
Fowl bluegrass	<i>Poa palustris</i>	0.87	2.59%	41.50
Poverty grass	<i>Danthonia spicata</i>	0.50	1.50%	4.60
False Melic	<i>Schizachne purpurascens</i>	0.25	0.75%	2.90
Bluejoint	<i>Calamagrostis canadensis</i>	0.13	0.37%	12.90
Grasses Subtotal		7.00	20.87%	77.44
American vetch	<i>Vicia americana</i>	0.50	1.50%	0.38
Black-eyed susan	<i>Rudbeckia hirta</i>	0.26	0.77%	8.70
Smooth wild rose	<i>Rosa blanda</i>	0.16	0.47%	0.15
Stiff goldenrod	<i>Oligoneuron rigidum</i>	0.14	0.42%	2.10
Smooth aster	<i>Symphotrichum laeve</i>	0.14	0.43%	2.90
Tall cinquefoil	<i>Drymocallis arguta</i>	0.06	0.19%	5.30
Gray goldenrod	<i>Solidago nemoralis</i>	0.06	0.18%	6.80
Flat-topped aster	<i>Doellingeria umbellata</i>	0.04	0.12%	1.00
Upland white aster	<i>Solidago ptarmicoides</i>	0.04	0.13%	1.00
Common yarrow	<i>Achillea millefolium</i>	0.03	0.09%	2.00
Lindley's Aster	<i>Symphotrichum ciliolatum</i>	0.03	0.10%	1.00
Pearly everlasting	<i>Anaphalis margaritacea</i>	0.02	0.05%	1.30
Large-leaved aster	<i>Eurybia macrophylla</i>	0.02	0.05%	0.18
Forbs Subtotal		1.50	4.50%	32.81
Oats	<i>Avena sativa</i>	25.00	74.63%	11.14
Cover Crop Subtotal		25.00	74.63%	11.14
Total		33.50	100.00%	121.39
Purpose:	Partly shaded grassland planting for native roadsides, reclamation, etc in north-central and northeast MN			
Planting Area:	Laurentian Mixed Forest Province excluding Chippewa Plains, Pine Moraines & Outwash Plains, and Mille Lacs Uplands subsections. Mn/DOT Districts 1 & 2(east).			

1 SEED MIX A - MN STATE MIX 36-311 FOR UPLAND RESTORATION AREAS
NOT TO SCALE

34-361 RIPARIAN NORTHEAST				
Common Name	Scientific Name	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
Virginia wild rye	<i>Elymus virginicus</i>	2.00	6.33%	3.08
American slough grass	<i>Beckmannia syzigachne</i>	1.50	4.78%	27.64
Fowl bluegrass	<i>Poa palustris</i>	0.70	2.23%	33.50
Riverbank wild rye	<i>Elymus riparius</i>	0.50	1.57%	0.53
Tall manna grass	<i>Glyceria grandis</i>	0.25	0.80%	6.50
Rice cut grass	<i>Leersia oryzoides</i>	0.15	0.49%	1.93
Fowl manna grass	<i>Glyceria striata</i>	0.09	0.29%	3.00
Bluejoint	<i>Calamagrostis canadensis</i>	0.06	0.19%	6.00
Grasses Subtotal		5.25	16.68%	82.18
Fox sedge	<i>Carex vulpinoidea</i>	0.20	0.65%	7.50
Dark green bulrush	<i>Scirpus atrovirens</i>	0.12	0.38%	20.00
Pointed broom sedge	<i>Carex scoparia</i>	0.06	0.21%	2.00
Woolgrass	<i>Scirpus cyperinus</i>	0.05	0.15%	30.00
Tussock sedge	<i>Carex stricta</i>	0.04	0.13%	0.80
Path rush	<i>Juncus tenuis</i>	0.03	0.09%	10.00
Sedges & Rushes Subtotal		0.50	1.61%	70.30
Blue vervain	<i>Verbena hastata</i>	0.22	0.68%	7.35
Marsh milkweed	<i>Asclepias incarnata</i>	0.12	0.38%	0.21
Spotted Joe pye weed	<i>Eutrochium maculatum</i>	0.11	0.34%	3.70
Grass-leaved goldenrod	<i>Euthamia graminifolia</i>	0.07	0.22%	9.00
Giant sunflower	<i>Helianthus giganteus</i>	0.07	0.22%	0.25
Common boneset	<i>Eupatorium perfoliatum</i>	0.05	0.16%	3.00
Flat-topped aster	<i>Doellingeria umbellata</i>	0.04	0.13%	1.00
Spotted touch-me-not	<i>Impatiens capensis</i>	0.03	0.11%	0.05
Blue monkey flower	<i>Mimulus ringens</i>	0.02	0.05%	13.00
Giant goldenrod	<i>Solidago gigantea</i>	0.02	0.05%	1.50
Forbs Subtotal		0.75	2.34%	39.06
Oats	<i>Avena sativa</i>	25.00	79.37%	11.14
Cover Crop Subtotal		25.00	79.37%	11.14
Total		31.50	100.00%	202.67
Purpose:	Native riparian and floodplain plantings for wetland mitigation, ecological restoration, or general permanent cover after culvert or bridge work. Tolerates partial shade.			
Planting Area:	Laurentian Mixed Forest Province. Mn/DOT Districts 1, 2(east) and 3A.			

2 SEED MIX B - MN STATE MIX 34-361 FOR RIPARIAN RESTORATION AREAS
NOT TO SCALE

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I hereby certify that this plan, specification or report was prepared by me or under my direct supervision, and that I am a duly Licensed Landscape Architect under the laws of the State of Minnesota.
Name: ANDREA M. WEDJUL License #: 52234
Date: -

Operations Services
Safety
Facilities
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KINGSBURY CREEK RESTORATION
Duluth, Minnesota
DNR Division of Ecological and Water Resources
St. Louis County (MN)
Section: 10,11,13,14 Township: 49N Range: 15W

Revisions
Date By

Title: SEED MIXES & PLANTING SCHEDULE
Survey: RRE 12/20 Designed: BARR 01/21
Drawn: BARR 12/20 Drawn: BARR 01/21
Checked: JCO 12/20 Checked: AMW 02/21
Horz. datum: St. Louis Co. Coord. Vert. datum: NAVD88

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